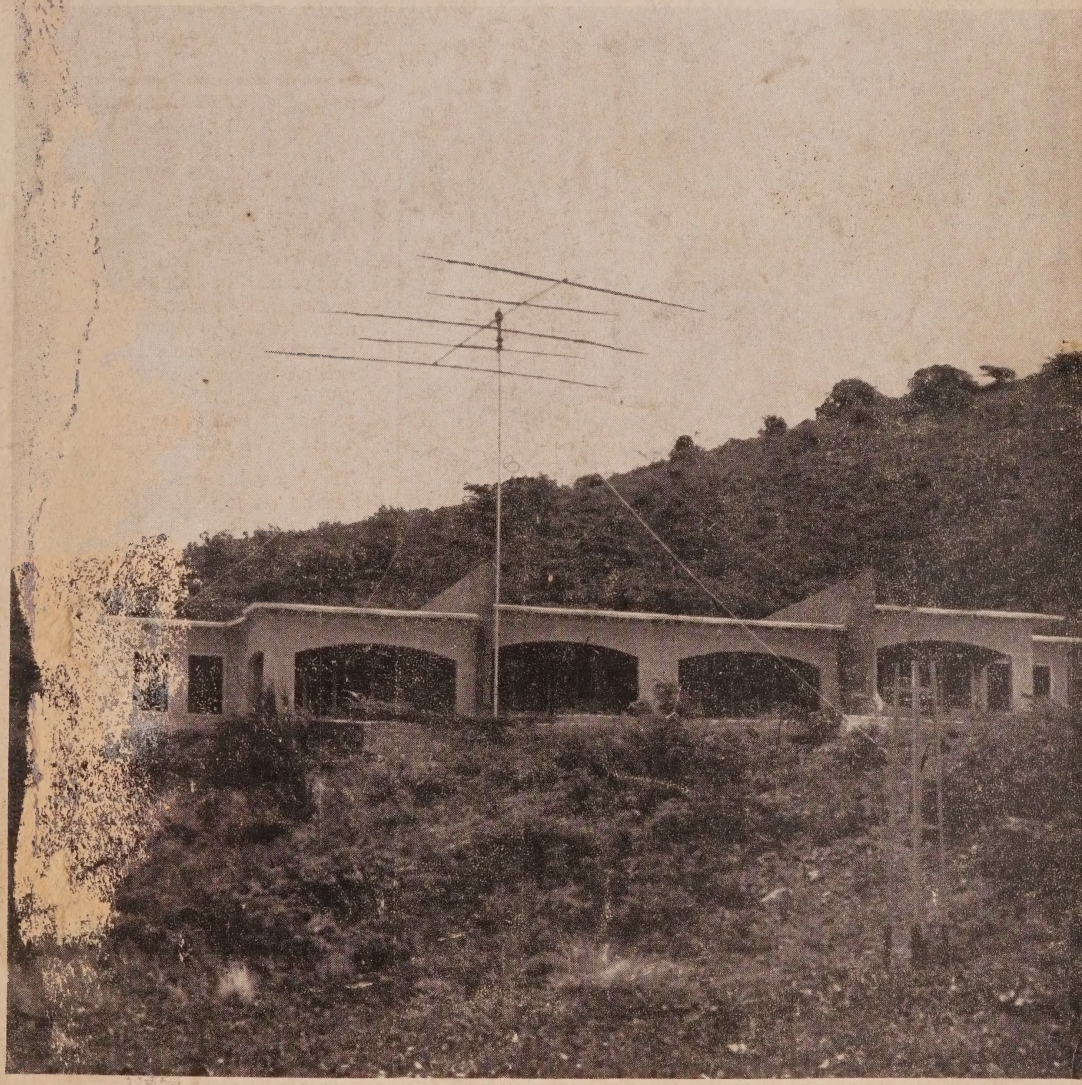
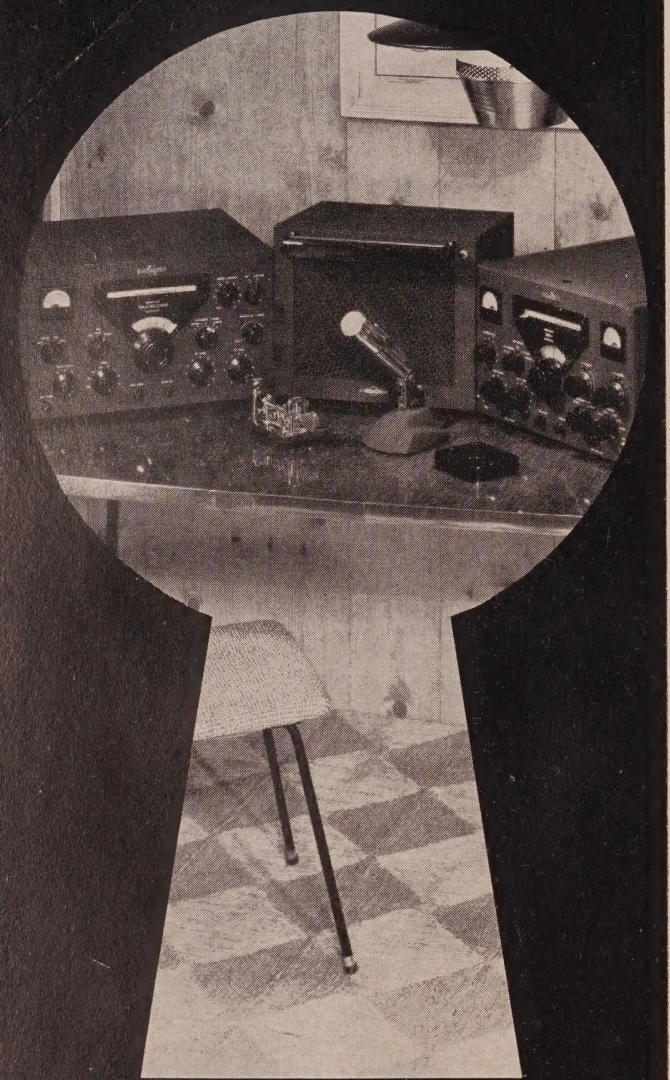
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CQ

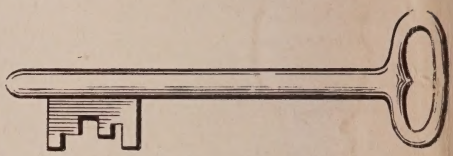
RADIO AMATEURS' JOURNAL



PJ2MC St. Martens, D.W.I.



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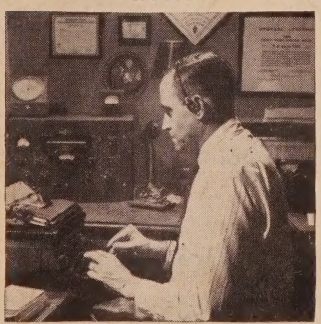
Past Winners



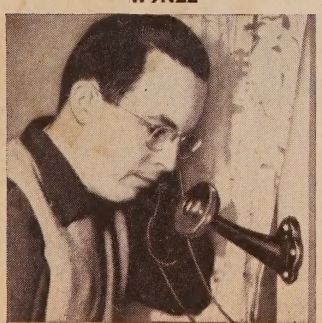
1955: Robert W. Gunderson, W2JIO



1954: Benjamin S. Hamilton, W6VFT



1953: J. Stan Surber, W9NZZ



1952: Don L. Mullican, W5PHP

NOMINATIONS INVITED FOR FIFTH ANNUAL EDISON AWARD

THE 1956 Edison Radio Amateur Award again will honor an amateur who has rendered important public service. As before, the Award also will serve to acknowledge the generous help which all radio amateurs offer their communities and the nation when need arises.

For 1956, a new Award winner will be added to the four whose pictures, names, and call letters appear at left. He will receive the handsome Edison Award trophy, a $500 check, and nationwide recognition.

A committee of distinguished and impartial judges will select the winner, from candidates who are nominated by letters from you and others.

Since only names submitted in this way will be considered by the judges, your participation is vital. Start now to choose your candidate for the 1956 Edison Award! The rules below will help guide you in preparing your nominating letter. Mail it to *Edison Award Committee, General Electric Company, Schenectady 5, N. Y.*

RULES OF THE AWARD

WHO IS ELIGIBLE. Any man or woman holding a radio amateur's license issued by the F.C.C., Washington, D.C., who in 1956 performed a meritorious public service in behalf of an individual or group. The service must have been performed while the candidate was pursuing his hobby as an amateur within the continental limits of the United States.

WINNER OF THE AWARD will receive the Edison trophy in a public ceremony in Washington, D.C. Expenses of his trip to that city will be paid.

$500 GIFT. Winner will be presented with a check for this amount in recognition of the public service he has rendered as a radio amateur.

WHO CAN NOMINATE. Any individual, club, or association familiar with the public service performed.

HOW TO NOMINATE. Include in a letter a full description of the service performed, as well as the candidate's name, address, and call letters. Your letter of nomination must be postmarked not later than January 3, 1957.

BASIS FOR JUDGING. All entries will be reviewed by a group of distinguished and impartial judges. Their decisions will be based on (1) the greatest benefit to an individual or group, (2) the amount of ingenuity and sacrifice displayed in performing the service. The judges will be:

E. ROLAND HARRIMAN, President, The American Red Cross.

HERBERT HOOVER, JR., The Under Secretary, U.S. Department of State.

ROSEL H. HYDE, Commissioner, Federal Communications Commission.

GOODWIN L. DOSLAND, President, American Radio Relay League.

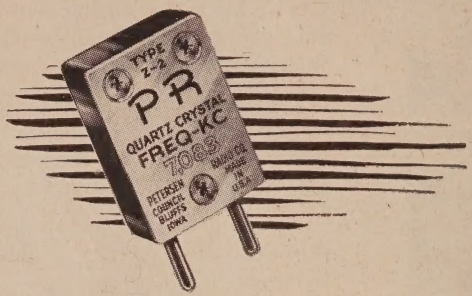
Winner of the Award will be announced on or before Thomas A. Edison's birthday, February 11, 1957.

Employees of the General Electric Company may nominate candidates for the Edison Radio Amateur Award, but are not permitted to receive the Award.

GENERAL ELECTRIC

166-185

ONLY THE BEST IS GOOD ENOUGH!



In many respects, Crystals are like "diamonds." You can buy them from six-bits up. It may be difficult to tell quality from a distance, but measured under close-up of performance, accuracy and stability . . . quality stands out. After all, your frequency control is the heart of your transmitter. When you trust your frequency to PR you know where you are . . . today, tomorrow and years from now. This is worth a great deal. In the long run the money you put in a crystal is not important . . . because even quality PRs cost little. When you buy a PR from your jobber you can get the exact frequency you want (integral kilocycle) within amateur bands, at no extra cost. You can be where you want to be . . . not within 5, 10 or 15 KC., but JUST WHERE YOU WANT TO BE! That means a lot.

20 METERS, Type Z-3, $3.95 • 40, 80 AND 160 METERS, Type Z-2, $2.95

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Since 1934

USE PR AND KNOW WHERE YOU ARE

PETERSEN RADIO COMPANY, INC.
2800 W. BROADWAY • COUNCIL BLUFFS, IOWA

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Vol. 12, No. 9 **CQ, The Radio Amateurs' Journal** September, 1956

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HEATHKIT

DX-100

PHONE AND CW

transmitter

KIT

FEATURES

Design proven through actual signal reports.

★

Only top-quality components used throughout.

★

5-point TVI suppression, and pi network output to match 50 to 600 ohms.

★

Detailed construction manual for simplified assembly.

★

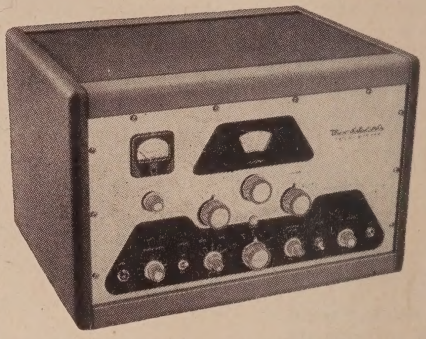
100 watts output on 160, 80, 40, 20, 15, 11, and 10 meters.

★

Attractive and functional physical design.

The Heathkit Model DX-100 Transmitter is rapidly becoming the "standard" ham rig in its power class. The high quality and outstanding performance it offers can be matched only in equipment costing many dollars more. It features a built-in VFO, modulator, and power supplies, and is bandswitching for phone or CW operation on 160, 80, 40, 20, 15, 11, and 10 meters. The kit includes a detailed construction manual, the cabinet, all tubes, prewound coils, and all other parts necessary for construction.

Push-pull 1625 tubes are used to modulate parallel 6164 tubes for RF output in excess of 100 watts on phone, and 120 watts on CW. May be excited from the built-in VFO or from crystals. Features pi network output circuit, illuminated VFO dial and meter face, and 5-point TVI suppression. High grade, well-rated parts supplied. Schematic diagram and technical specifications on request.



MODEL DX-100

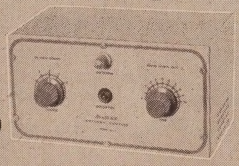
$189.50

Shpg. Wt. 107 Lbs.

Shipped Motor Freight unless otherwise specified. $50.00 deposit required on all C.O.D. orders.

HEATHKIT

antenna coupler KIT



MODEL AC-1

$14.50

Shpg. Wt. 4 Lbs.

In addition to matching a low power transmitter to an end-fed long wire antenna, this antenna coupler incorporates a 3-section low-pass filter, to attenuate output above 36 mc and reduce TVI. Handles up to 75 watts, 10 through 80 meters. 52 ohm coaxial input—tapped inductor and variable capacitor—neon RF indicator. Ideal for use with the Heathkit AT-1 Transmitter.

HEATH COMPANY

A Subsidiary of Daystrom, Inc.

BENTON HARBOR 12, MICHIGAN

HEATHKIT

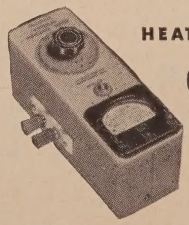
grid dip meter KIT

The Model GD-1B is a time-proven instrument. It will enable you to accomplish literally hundreds of jobs on all types of equipment. Frequency range is from 2 mc to 250 mc. A 500 ua meter is employed for indication, and a sensitivity control and headphone jack are provided. Includes pre-wound coils and rack. Indispensable for the ham, serviceman, and engineer. Extra coils available to extend frequency down to 350 kc.



MODEL GD-1B **$19.50**

Shpg. Wt. 4 Lbs.



HEATHKIT

antenna impedance meter KIT

Used with an RF signal source, the AM-1 will enable you to match your antenna-receiver-transmitter system for optimum operation. Will double as a phone monitor or relative field strength meter. Uses 100 ua meter, and covers 0 to 600 ohms. Frequency to 150 mc.

MODEL AM-1

$14.50

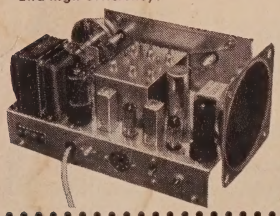
Shpg. Wt. 2 Lbs.

HEATHKIT communications-type all band receiver KIT

Slide-rule dial —electrical bandspread—ham bands marked.

Slug-tuned coils and efficient IF transformers for good sensitivity and selectivity.

Transformer-operated power supply for safety and high efficiency.



The Model AR-3 receiver features new high-Q slug-tuned coils, new layout, and new-type IF transformers. The result is high sensitivity and selectivity and better image rejection on all bands.

Transformer-type power supply, electrical bandspread, RF and AF gain controls, antenna trimmer, AGC, BFO, headphone jacks, socket for Q multiplier, 5½" PM speaker and illuminated dial.

SPECIFICATIONS:

Frequency Range—550 kc to 30 mc on four bands.
Tube Complement—1—12BE6 oscillator and mixer • 1—12BA6 IF amplifier • 1—12BA6 second detector, AVC, first audio amplifier and reflex BFO • 1—12A6 beam power output • 1—5Y3 full wave rectifier



$27.95 *(Less Cabinet)*
MODEL AR-3
Shpg. Wt. 12 Lbs.

CABINET: Fabric-covered cabinet available. Includes aluminum panel, speaker grille, and protective rubber feet. Measures 12¼" W. x 6¾" H. x 7¾" D. No. 91-15. Shpg. Wt. 5 Lbs. **$4.50.**

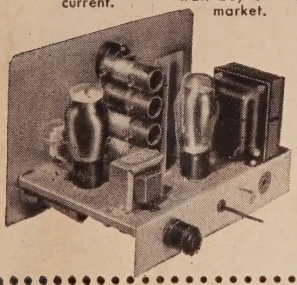
HEATHKIT CW amateur transmitter KIT

Single-knob bandswitching for 80, 40, 20, 15, 11, and 10 meters.

Panel meter monitors final grid or plate current.

Plate power input 25-30 watts.

Best dollar-per-watt buy on the market.



The AT-1 is complete with its own power supply, and covers 80, 40, 20, 15, 11, and 10 meters with single-knob bandswitching. Designed for crystal or external VFO excitation. Incorporates key-click filter, line filter, copper plated chassis, pre-wound coils, 52-ohm coaxial output, panel meter, and high quality components throughout. Easy to build, even for the beginner. Employs 6AG7 oscillator and 6L6 final. Up to 30 watts power input.



$29.50 **MODEL AT-1**
Shpg. Wt. 15 Lbs.

SPECIFICATIONS:

RF Amplifier Power Input	25-30 watts
Output Connection	52 ohms
Band Coverage	80, 40, 20, 15, 11, 10 Meters
Tube Complement:	
5U4G	Rectifier
6AG7	Oscillator—Multiplier
6L6	Amplifier—Doubler

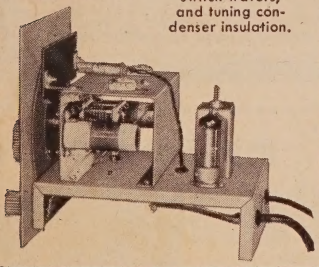
OA2 voltage regulator tube for stability.

Covers 160-80-40-20-15-11-10 meters.

Smooth-acting, illuminated and pre-calibrated dial.

6AU6 electron-coupled Clapp oscillator.

Copper plated chassis—aluminum case—profuse shielding—ceramic coil forms, switch wafers, and tuning condenser insulation.



HEATHKIT vfo KIT

The Model VF-1 features illuminated and pre-calibrated dial scale. Cable and plug provided to fit the crystal socket of any modern transmitter. Covers 160-80-40-20-15-11 and 10 meters with 3 basic oscillator frequencies. Better than 10 volt average RF output on fundamentals. Derives operating power from transmitter power supply. Has VR tube for stability. Go VFO for more operating enjoyment.

MODEL VF-1

$19.50

Shpg. Wt. 7 Lbs.



SPECIFICATIONS:

Output Frequencies—1750-2000 kc, 7000-7425 kc, 6740-6808 kc. **Calibrated Bands**—160-80-40-20-15-11-10 meters. **Tube Compliment**—6AU6 Oscillator OA2 Voltage Regulator. **Power Requirements**—250-350 VDC @ 15-20 ma. and 6.3 VAC @ .45A.

ORDER DIRECT FROM THIS AD . . . OR WRITE FOR FREE CATALOG. Describes more than 65 interesting "build-it-yourself" projects. Amateur equipment, hi fi amplifiers, and the complete Heathkit line of test instruments. Get yours today!

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BENTON HARBOR 12, MICHIGAN



Feenix, Ariz.

Deer Hon. Ed:

Please not making any loud noyses while reeding this letter. No scraping of your Hon. Chair on the floor, and being carefool that nobuddies slamming door of your office, as in my present condishun the slitest noyse are giving me hart failyour. Just keeping everything reel quiet while I telling you horribul eggspeariance I having. Kay debackle, as they saying in France.

It all happening on acct. Scratchi are reel red-blooded paytriotick feller. When Feenix are planning for county-wide civil defense eggsersize, I are rushing down, Scratchi-on-the-spot, and volunteering with my car and Hon. Mobile unit. After all, Hon. Ed., are having 100 whats mobile unit, and that are not to be sneezed at.

Peeples at CD office are not seeming reel happy to seeing me, and saying something about having enuf trubbles as it is, but they finally desiding to letting me patrol a mounten outside the city, to reporting on how things are doing on the mounten. This are sooting Scratchi reel peechy, on acct. are figyouring can even working some DX if things getting reel dull. Ha! If things getting reel dull!! Hon. Ed., never are I having a time that are not dull like this time.

Hole alert are skedyuled to starting at noon, so Scratchi getting erly start, and are up in mounten by eleven-thirty, on road what overlooking hole city of Feenix. Evidentally word are getting around about CD test, as hole mounten seeming to be deserted.

I can telling things are getting underway, as I are listening not only on CD freakwencies, but also on BC reseever in car. Are not doing any xmitting, on acct. CD hedquarters telling me not to getting on air until they calling me.

At noontime Scratchi are sitting reel quiet, enjoying view. Not seeing anything happening at noon, but knowing alert are on skedyule as BC stayshuns giving the news. Control stayshun at CD hedquarters are calling role, asking each mobile stayshun to reporting in.

When heering my call letters, I picking up mike, pushing button, and W H O O M ! ! the

HEATHKIT NEW DX-35 phone and cw transmitter KIT



MODEL DX-35

$56.95

Shpg. Wt. 24 Lbs.

- Built-in modulator for phone operation.
- Bandswitching on 80, 40, 20, 15, 11 and 10 meters. Pi network output coupling.
- Switch selection of three crystals—provision for external VFO excitation.
- Attractive and functional physical design.

This brand new transmitter model provides phone and CW operation on 80, 40, 20, 15, 11, and 10 meters. Plate power input to 65 watts on CW and controlled carrier modulation peaks to 50 watts on phone. Completely bandswitching.

Employs two-stage 12AX7 speech amplifier, 12AU7 modulator, 12BY7 oscillator, 12BY7 buffer, and 6146 final. The buffer stage assures plenty of drive to the final on all bands. Pi network output coupling employed for easy antenna loading. Switch selection of crystals. Crystals changed without removing transmitter cabinet. Husky power transformer and choke are potted, and the circuit is well shielded. Meter indicates final grid or plate current.

Truly a remarkable transmitter package for the price. Ideal both for the novice and for the more experienced operator.

Send for free 1956 Heathkit Catalog describing more than 65 interesting "build-it-yourself" projects.

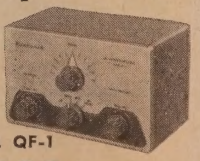
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BENTON HARBOR 12, MICHIGAN

HEATHKIT "Q" multiplier KIT

Provides extra selectivity for separating signals, or will reject one signal to eliminate heterodyne. Effective Q of 4,000 for sharp "peak" or "null." Tunes any signal within receiver IF. Operates with 450 to 460 kc IF. Will not function with AC-DC type receivers. Requires 6.3 VAC at 300 ma, and 150-250 VDC at 2 ma.



MODEL QF-1

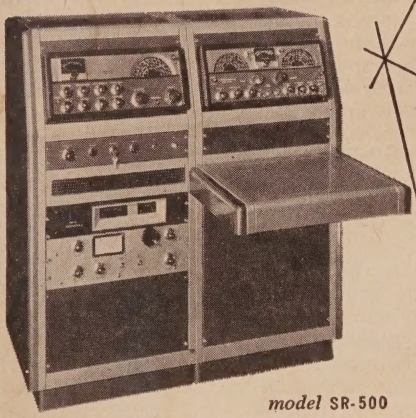
$9.95 Shpg. Wt. 3 Lbs.

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For the first time
commercial broadcast styling in one
COMPLETE AMATEUR RADIO STATION

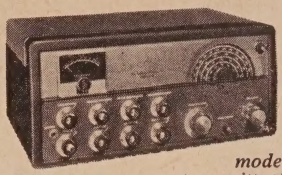
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model SR-500



model **SR-500**

A completely contained unit in a handsome console cabinet—transmitter/exciter, linear power amplifier, receiver—affording the finest in V.F.O. or crystal. SSB, AM and CW transmission and reception. You need supply only the antenna, microphone and AC power. All the wiring is complete, and external connections are provided for antennae and microphone. The transmitting and receiving units are located for maximum efficiency in coordinated operation. A special communications speaker is positioned above the operating shelf directly in front of the operator. Console is mounted on casters and is easily expandable. Three blank panels provided in the basic cabinet for installation of any additional equipment desired. All safety and protective features incorporated. Completely enclosed, fused with the main power relay controlled by a key lock. Entire back of cabinet is enclosed and perforated for maximum ventilation and heat dissipation. $1495.00



model **HT-30**
transmitter/exciter

Built in V.F.O. reads directly in kilocycles. V.F.O. stability is equal to most crystals—.009%. There are also provisions for 1 crystal for fixed frequency operation. Selective filter system is same used by commercial communications companies for reliable sideband selection to assure continued suppression of unwanted side band energy (down 40 db or more) and distortion products. New 50 db range meter for constant monitoring of r-f output and carrier suppression. Voice control system built in with adjustable delay and anti-trip features. Front panel controls allow selection of AM, CW, and upper or lower side band. $495.00



model **SX-100**
receiver

"Tee-Notch" Filter provides a stable non-regenerative system for the rejection of unwanted heterodyne in SSB. The "Tee-Notch" also produces an effective steepening of the already excellent 50 mc i-f pass band (made famous in the SX-96). Upper or lower side band selectable by front panel switch. Notch depth control for maximum null adjustment • Antenna trimmer • Plug-in laboratory type evacuated 100 kc quartz crystal calibrator—included in price • Second conversion oscillator crystal controlled—greater stability through crystal control and additional temperature compensation of high frequency oscillator circuits. $295.00



model **HT-31**
linear power amplifier

Continuous frequency coverage from 3.5 mc to 30 mc • Pi-network output for efficient harmonic and T.V.I. suppression • Major T.V.I. suppression built in • Does not require an antenna tuner as will feed loads from 50 to 600 ohms • Full metering of all important circuits, including input in watts • Employs two 811-A zero bias triodes in parallel. The input system is designed to be fed from a 50-70 ohm unbalanced line and requires a maximum of 10 watts drive on 80 meters. The grid tank circuit is balanced to provide all band neutralization. $395.00

hallicrafters

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Designed for



Application



The No. 90672
ANTENNA BRIDGE

The Millen 90672 Antenna Bridge is an accurate and sensitive bridge for measuring impedances in the range of 5 to 500 ohms at radio frequencies up to 200 mc. It is entirely different in basic design from previous devices offered for this type service inasmuch as it employs no variable resistors of any sort. The variable element is an especially designed differential variable capacitor capable of high accuracy and permanency of calibration over a wide range of frequencies. A grid dip meter such as the Millen 90651 may be used as the source of RF signal. The bridge may be used to measure antenna radiation resistance, antenna resonance, transmission line impedance, standing wave ratio, receiver input impedance and many other radio frequency impedances. By means of the antenna bridge, an antenna matching unit may be adjusted so as to provide the minimum standing wave ratio on the radiation system at all frequencies.

JAMES MILLEN MFG. CO., INC.

MAIN OFFICE AND FACTORY
MALDEN
MASSACHUSETTS

hole mounten are vibrating, rocks are falling all around me, dust are filling the air, and I are so deafened by eggsploshun that are taking few seconds for me to heering CD control stayshun calling me wildly, asking what are happening on mounten.

I calling them back and telling them that what they heering I heering too, only I are rite where it are happening, and if they not minding, I getting the heck out of there. I asking them what cawsing eggspolshun, but they not knowing ether, so I grinding cupple geers on car, and moving about one mile down the road.

By this time the BC stayshuns giving report on uneggsplaned eggsploshun in mounten, and CD freakwencies are buzzing. Just then local CD chief are getting on air and asking me if I seeing any planes. I picking up mike, pushing button, and W H O O M ! ! another eggsploshun are picking up my car about to inches and slamming it down, rock are crashing into windshield and busting it into scillion pieces, and dust are so thick I can't telling if car are still on road.

This time not waiting for peeples to telling me I can moving, Scratchi are just moving, but fast. Getting about half-miles away when Hon. CD Chief again calling me, asking if I ok, and what are happening. I desiding to answer him but not stop the car, so grabbing mike and pushing button and, yep, Hon. Ed., you gessing it. Another eggsploshun. Only this are granddaddy of them all.

Hole side of mounten coming down on road. Shock are pushing car against side of mounten, crumpling fenders. Little stones, medium size stones and big stones hitting car, sounding like drummer in jive sesshun. Hole inside of car covered with dust, and Scratchi looking like miner after ate hours work underground.

It are at this point that I are desiding to going home, CD or no CD. On way home are listening to BC reseever, and evidently everybuddies worried, on acct. they alerting squadron of planes to searching for caws of eggsploshuns, and one newscaster saying that maybe Feenix are being bombed by foren power. At any rates, hole CD eggsersize are nocked into cocked hat.

Next day Scratchi's nerves are still running around in circles, chasing each other, are having bad case of not being able to heering much, and it practikally driving me undercover whenever parakeet in house are cracking a seed.

Late in morning Hon. CD Chief and some other peeples coming to house and asking if I minding if they looking at mobile rig I having in car. I telling them I not minding, so out they go.

Little later they coming back in and saying they solving mistery of all the eggsploshuns. It seeming that contracktor are bilding and enlarging mounten road where Scratchi are.

[*Continued on page 126*]

designed...

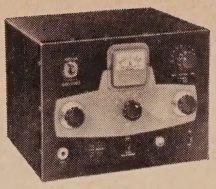
WITH THE FEATURES YOU WANT

Loaded with features . . . packed with plenty of power . . . Viking transmitters are "first choice" for amateurs the world over. Designed strictly for amateurs, the complete Viking transmitter line is sure to contain a unit with the features you want at the price you want to pay!

styled...

WITH A MODERN FLAIR

Truly professional in appearance, Viking transmitters are styled for beauty as well as functional design. Sturdy steel cabinets are finished in handsome maroon and grey with attractive green nomenclature. Meters are easy to read ...rugged phenolic knobs are equipped with heavy, integral molded brass inserts.



50 watts CW input . . .band-switching 80 through 10 meters!

VIKING "ADVENTURER"—An ideal CW transmitter for the beginning amateur . . . the perfect standby transmitter for the experienced amateur. Effectively TVI suppressed . . . built-in power supply! Easy to assemble and operate — packs enough power for world-wide contacts. Wide range pi-network output tuning — no antenna tuner needed. Complete with tubes, less crystal and key.

Cat. No. 240-181

Kit .....**$54.95** Amateur Net

VIKING "VALIANT" — Built-in VFO or crystal control. Pi-network antenna matching from 50 to 600 ohms — final tank coil silver-plated. Timed sequence, break-in keying . . . TVI suppressed . . . high gain push-to-talk audio system . . . low level audio clipping . . . built-in low pass audio filter. As an exciter, will drive any of the popular kilowatt level tubes. Complete with tubes, less crystals, key and mike.

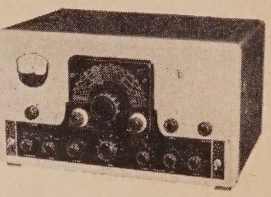
Cat. No. 240-104

Kit .....**$349.50** Amateur Net

Cat. No. 240-104-2

Wired, tested. **439.50** Amateur Net

*P.E.P. input with auxiliary SSB exciter.



275 watts CW and SSB... 200 watts phone! Band-switching 160 through 10 meters!*



Johnson

... the complete transmitting line!

engineered...

FOR OUTSTANDING PERFORMANCE

Packed with only the highest quality components, Viking transmitters are engineered for outstanding flexibility and performance. Revolutionary circuit designs have often been copied . . . but never equalled for dependability and features.

built by...

THE E. F. JOHNSON COMPANY

Amateur radio is lots of fun! And the fortunate amateur who owns Viking equipment enjoys the maximum amount of operating pleasure and performance. Owning a Viking means more than just having the best transmitter . . . it means more than the DX record you build; it means that your station has arrived! For effective, practical design and honest dollar value, Viking transmitters stand ahead of all others . . . the big "J" on the front panel tells you beyond a doubt whether you choose the "Adventurer" as your first transmitter, or the fabulous "Kilowatt" as the "last word," that your transmitter dollar is soundly invested.



600 watts CW . . . 500 watts AM and SSB. Bandswitching 80 through 10 meters!*

VIKING "FIVE HUNDRED" — A complete 500 watt transmitter . . . VFO and all exciter stages gang-tuned! Two compact units: RF unit is small enough to place on your operating desk beside your receiver. Built-in VFO or crystal control . . . effectively TVI suppressed . . . high gain push-to-talk audio . . . timed sequence, break-in keying . . . low level audio clipping. Complete with tubes, less crystals, key and mike.

Cat. No. 240-500

Kit .....**$649.50** Amateur Net

Cat. No. 240-500-2

Wired, tested . **799.50** Amateur Net

*P.E.P input with auxiliary SSB exciter.

(Prices subject to revision at time of delivery)

VIKING "6N2" — New for VHF! Designed for use with the Viking "Ranger," Viking I, Viking II or similar power supply/modulator combinations capable of at least 6.3 VAC at 3.5 amp., 300 VDC at 70 ma., 300 to 750 VDC at 200 ma. and 30 or more watts audio. Operates by external VFO (with 8-9 mc output) or built-in crystal control. All circuits metered. Complete with tubes, less crystals, key and mike.

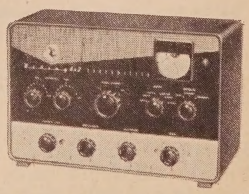
Cat. No. 240-201

Kit .....**$99.50** Amateur Net

Cat. No. 240-201-2

Wired, tested. **129.50** Amateur Net

(Prices subject to revision at time of delivery)



For 6 and 2 meters! 150 watts CW input . . . 100 watts AM!

E. F. Johnson Company

2937 SECOND AVENUE SOUTHWEST • WASECA, MINNESOTA

EDITORIAL
WAYNE GREEN

. . . de W2NSD

NEVER SAY DIE

As a follow-up on my trip to Texas I must sadly report that the dreams of riches have faded for Bernie, W5YVJ, the sad owner of a very very deep salt water well. And they didn't even leave the drilling tower behind to use for beams! All the worse because the city of Houston brought in one of the biggest wells in recent history just ⅜ mile away on city property. Frustrating.

Travel Fever

To tell you the truth I sort of got carried away by this traveling business this summer. The trip to Texas got me into a reckless mood and when a free weekend loomed up a few days later I went down to the airport and hopped a plane to Bermuda. The decision came Thursday evening, by ten the next morning I was in the air and by three I was skin diving in the fantastically clear Bermuda waters.



Cyril VP9L, Jules VP9BM, and Bill VP9BN outside new clubhouse of The Radio Society of Bermuda where they lured the innocent CQ editor to a work (gasp) party.

I visited Bill Jones, VP9BN and by some strange set of conditions managed to contact Murray, K2CBO in Brooklyn, just three blocks from home. I had hoped to hear W5YVJ and KV4AA, but didn't really expect to. Bill took me out to a surprise birthday party for a friend and when we returned near midnight I figured the chances of hooking Bernie or Dick would be nil so I got on my put-put bicycle and headed back to the hotel. Bill insisted he was going to work them anyway and went up to his shack to have a tilt with the QRM. I laughed as I waved goodbye and bounced down the road.

Bernie told me later that he was flabbergasted when he got up from his TV, turned on the receiver and for the first time in days tuned across the DX part of 20 to hear a strange voice calling W5YVJ. He fell all over himself getting the transmitter on the air. Bill won't admit it, but I'll bet he was pretty surprised too. They made a sked for the next night so I could say hello to Bernie.

As you probably have guessed by now, soon after Bill signed with Bernie he heard KV4AA and hooked him for a sked the following night. I knew he couldn't possibly work Dick that late at night because Dick always goes to bed early so he can catch the morning DX. On this one occasion Dick had a visitor who was staying up to operate his station. Fate? Probably just as surprising to the regular 20 meter men is the fact that both skeds the next evening worked out fine. Quite a hobby we've got.

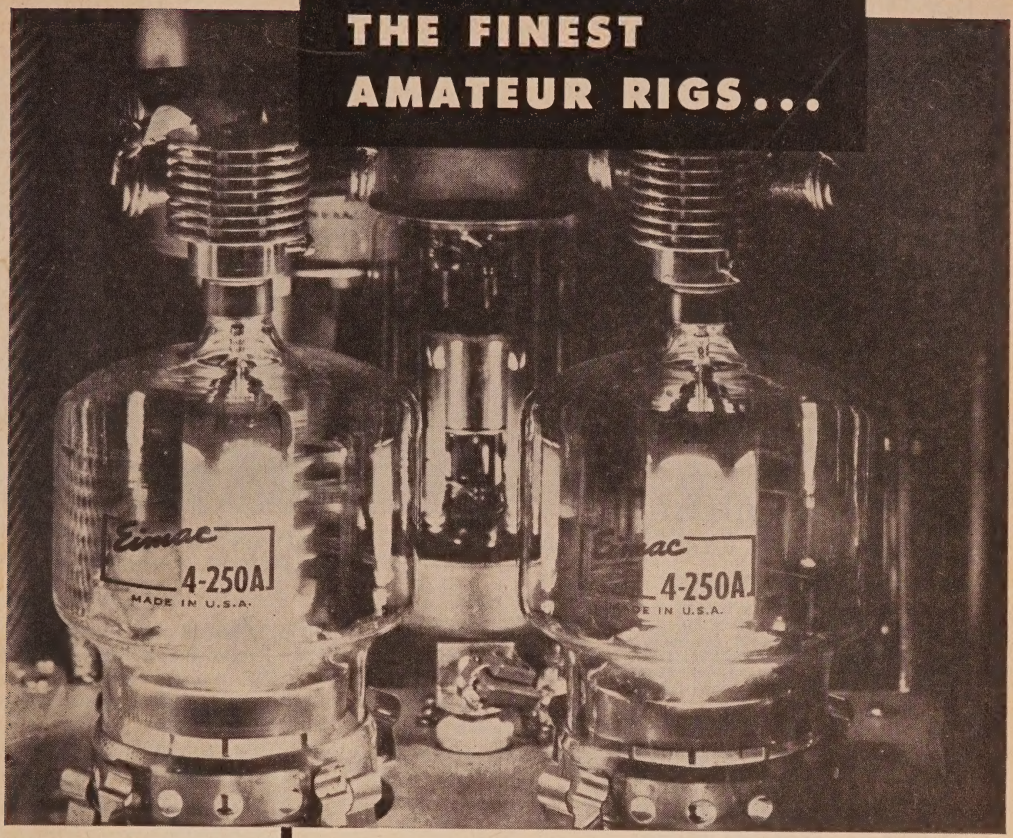
Jules, VP9BM invited me out on his boat with a couple friends for some skin diving on Sunday. I was horseback riding in the morning and almost missed the boat. I came skidding to a halt on the beach just as Jules was heading out around the bay and by chance he saw my frantic waving from the shore. We dove all around the harbor inlet and had a wonderful time. Jules spotted a hamlet (a fish, not a small ham) and managed to sneak up on him with his spear. It was a good sized fish so we pulled anchor and headed for a small island nearby with the ruins of an old fort on it. There we roasted the fish and ate it. Delicious. Members of clubs in the New York area may be subjected to a rather complete set of slides on this Bermuda trip if they allow their program chairman to invite me for a talk. Fair warning. One of my pictures didn't come out too well, so I may have to go back there for a few more days to retake that one. Ahem.

The National Convention

Bud Bane, W6WB, and the San Francisco gang put on a good convention. The high spots for most of the fellows I expect were the group gatherings for VHF, RTTY, Novice, Mobile, etc. Since I was not permitted to address any of the larger gatherings I would like to take this opportunity to thank the hundreds of you that introduced yourselves and to say that I am sorry if I missed meeting you.

After that long recount of my travels last

FOUNDATION OF THE FINEST AMATEUR RIGS...



EIMAC 4-250A

Radial-Beam Power Tetrode
Typical Operating Conditions
(Frequencies to 110Mc Per Tube)

	CW	AM	SSB
Plate Voltage	3000v	3000v	3000v
Driving Power*	2.6w	3.2w	0w
Power Input	1000w	675w	630w

*Driving Power Increases Above 40Mc.

The Eimac 4-250A s pictured above are the backbone of a popular and widely duplicated piece of ham equipment—the 4-250A final amplifier.

These tubes are running 1000 watts input AM phone, yet they're still well below their maximum ratings. And, they will continue operating at this high power year after year.

Conservatively, they handle one kilowatt input from 80 to 6 meters, AM, SSB and CW. In addition, low grid-plate capacitance, coupled with low-driving power requirements, mean substantial simplification in associated circuits and driver stages.

Weigh these advantages . . . you will find that the Eimac 4-250A is a sound investment. It is your assurance of quality and dependability.

For further information on the 4-250A, see your distributor or write to our Amateurs' Service Bureau.

Eimac

EITEL-McCULLOUGH, INC.
SAN BRUNO, CALIFORNIA
The World's Largest Manufacturer of Transmitting Tubes

how to get ahead in Communications Electronics

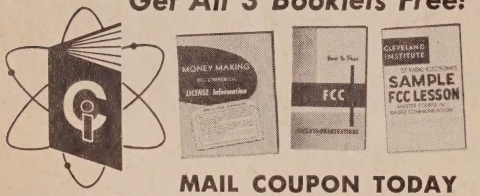
1. RAISE YOUR "HAM" TICKET TO A COMMERCIAL FCC TICKET

Proper training can qualify you for a Commercial FCC ticket. Your ham ticket can be your first step toward advancement in Electronics, but you need a Commercial ticket to make the grade professionally. We can provide the training you need. If you're serious about getting ahead, mail the coupon below today, for information on our home study courses.

2. GET INTO INTERESTING FULL OR PART TIME WORK IN MAINTAINING MOBILE RADIO SYSTEMS

A Commercial FCC ticket makes you eligible for high paying Full Time or Part Time work in Mobile Radio work. Only licensed personnel can do this work. Police radio, Taxi communications, and many other fields are open to men who have their License. Find out how to get your commercial license.

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Desk CQ-19, 4900 Euclid Ave., Cleveland 3, O.

Please send Free Booklets prepared to help me get ahead in Electronics. I have had training or experience in Electronics as indicated below:

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In what kind of work are you now engaged? _____

In what branch of Electronics are you interested? _____

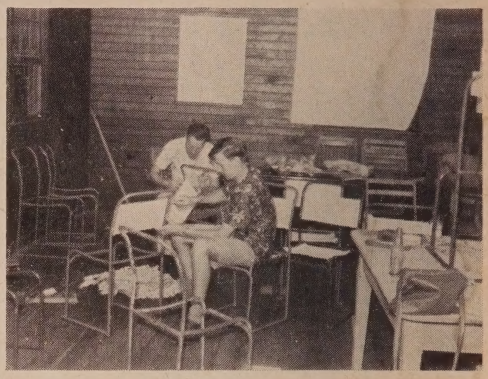
Name _____ Age _____

Address _____

City _____ Zone _____ State _____

Special Tuition Rates to Members of Armed Forces

month you are probably full up to here with such so I'll spare you the itinerary. I finally pried myself out of Southern California after two weeks and hied back to New York to pacify quitting department editors and try to get this issue on the presses. Just in time too, for I had been listening more and more to the siren whisperings of that bunch and was just



Bermuda club work party was ably assisted (?) by W2NSD taking pictures. Project: repairing chairs.

about to start shopping for a small ranch back in the hills where I could raise horses and antennas. Too bad I'm not going to tell you all about those two weeks, there were some terrific things happened!

Like for instance the trip down to Rolling Hills to the W6AM antenna farm. 90 foot telephone poles in every direction for miles! Incredible! We made a call for NYC on the Brooklyn rhombic, or was it the Staten Island rhombic? And we got through too. We listened for Danny on the Narau Island rhombic, but apparently he was still sleeping for we didn't hear him.

Or the Southern California DX Club meeting where I had to eat a free meal and sit through their yearly elections in order to get to show my Virgin Island slides.

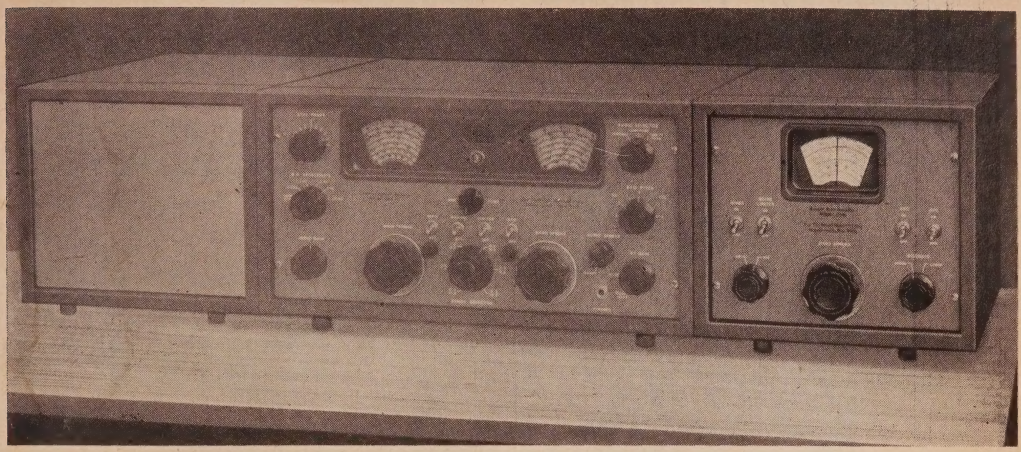
Or the trip to Catalina where I nearly froze to death skin diving in the warm California waters. Brrrr. Hope my underwater pictures come out.

The Upshot

All this traveling makes for a pretty good vacation, but further, it has gotten me out of the New York area and into touch with hundreds and hundreds of hams in other parts of the country (and world). This has widened my viewpoints on many things, encouraged me in my ideas of the development of *CQ*, and pointed up some of the most important changes in the offing. You have all been immensely encouraging and I am very pleased that you took the time and trouble to say hello.

8.548², Wayne, W2NSD

Single Sideband Adapter- GSB-1



The TMC Model GSB-1, Single Sideband Adapter is a filter type slicer permitting accurate and simple tuning of SSB signals.

The 455 Kc input is converted to a low frequency by means of a mixer and oscillator combination which allows selection of either sideband. The difference frequency is fed to a carefully designed and manufactured bandpass filter, which restricts the band width to 3 Kc at the 6 db points. This filter is so effective that the skirt width 40 db down is only 4.5 Kc. The filter output, in turn, is fed through a second mixer, or product detector, where it is combined with a stable 17 Kc local oscillator. The result is once again passed through a filter having a cutoff at 5 Kc, thus eliminating all unwanted mixer products. The output is a relatively noise and interference free audio signal.

The TMC Model GSB-1 contains a number of features which make it a more useful device. Since single sideband signals require critical frequency adjustment, this unit has been provided with electrical band spread which reduces tuning to the point of greatest simplicity and ease. In addition, AVC is provided within the Model GSB, over and above that which already exists within the receiver, thus serving to further prevent powerful local stations from overloading the slicer. A noise limiter, which reduces impulse peaks, has also been included in this unit.

The Model GSB-1 although originally designed for use with the Model GPR-90 receiver (which already provides the proper terminals) may be used with any receiver which will provide .3 volts (rms) R.F. input at approximately 455 Kc and where access to an audio grid is available.

FRONT PANEL CONTROLS:

- Power ON/OFF Switch
- AVC ON/OFF Switch
- SSB-AM Selector Switch
- Upper or Lower Sideband Selector Switch
- Noise Limiter ON/OFF Switch
- AVC FAST/SLOW Switch
- Main Tuning

SPECIFICATIONS:

FREQUENCY RANGE:
452-458 Kc.

TYPE OF RECEPTION:
AM, SSB (Upper or Lower), CW

IF INPUT VOLTAGE:
0.3 volts rms (normal) for 0.3 volts rms audio output.

IF INPUT VOLTAGE RANGE:
0.1-10 volts rms (with AVC).

AVC CHARACTERISTIC:
With 40 db change in input signal, output remains constant within 9db

INPUT IMPEDANCE:
High-from IF.

OUTPUT IMPEDANCE:
To match audio grid.

INPUT POWER:
115 volts, 50/60 cycles, 46 watts.

CABINET SIZE:
12" wide x 10" high x 15" deep. Matches GPR-90 for height & depth

Illustrated with the GSB-1 (right side) is the TMC Receiver GPR-90 (center) and the companion speaker - Bulletin 179C.

The TECHNICAL MATERIEL CORPORATION

TMC Canada, LTD.
OTTAWA, ONTARIO

MAMARONECK, NEW YORK.

TMC Single Sideband Adapter GSB-1 (Bulletin C-194) Complete with all instructions

AMATEUR NET

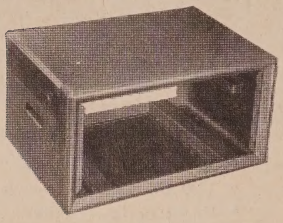
$149.50

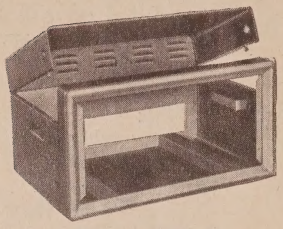
for your finest equipment

BUD

"PRESTIGE"

CABINETS





★ If you're proud of your equipment, you will want to house it in the new Bud "PRESTIGE" cabinets. These new cabinets are soundly engineered and versatile in usage. They are highly stylized with eye-pleasing contours.

Note how the hinged cover—available solid or perforated — swings back completely to provide easy access. See the two movable supporting channels, adjustable laterally, adaptable to any width chassis or mounting platform.

Bud "PRESTIGE" cabinets are built of 16 gauge steel, and flawlessly finished in grey hammertone. They will accommodate standard size relay rack panels.

Despite their custom appearance they are a stock item, reasonably priced and available for immediate delivery. See them at your Bud Distributor or write us for further details.

BUD RADIO, Inc.

Dept. C

2118 East 55th St. Cleveland 3, Ohio

Letters . . . to the editor

Dear Margaret,

I might state I received a wonderful response from the Ad which you ran for me in *CQ* a couple of months ago. I was able to sell all the equipment which I had listed. Thank you very much and with best regards to your staff I remain,

John P. Hemley, W5BNO

Dear Mr. Green,

Do you have a book on the subject of "How To Live With Ham Operators?" We have two in our family—father and son combination. For a year or so, everything was fine. Now they have gone mobile, and what's worse, bought a new car so they could fill the front seat with radio equipment.

Please help us. Either we will have to re-arrange our lives around the radio, or else we will re-arrange some radios around somebodies' necks.

Tnx, pse qsl . . . . . .

Confusedly,
Marylln

P.S. We are trying to be patient and longsuffering. For a long time we were patient; now we are suffering.

Transmission Lines

Gentlemen,

I have read with considerable interest the excellent article on A-C generators in the June *CQ*. I must take issue with the article where it implies that anything over 450 volt transmission lines should not be used by the average ham unles expert guidance can be had.

I wish to state without qualification that *440 volts is a killing voltage.* In fact, 440 volts can be more dangerous than higher voltages as lower voltages cause ventricular fibrillation where higher voltages *might* prevent this.

Dry Skin has a resistance of from 100,000 to 600,000 ohms.

Wet Skin resistance is 1,000 ohms.

Internal Body resistance from Hand to Foot runs from 400 to 600 ohms. Ear to Ear is about 100 ohms.

Thus it is seen that, because of body resistance, only very small currents can flow with moderate voltage, *Provided that the skin is dry, and, provided that the skin is not broken open.* Breaking through the skin is comparable to removing a coating of insulation and exposing the conductor underneath.

It requires only a current of about one-tenth of an ampere to kill a person. Note the following chart:

1 Millampere or less:
Causes no sensation. Not felt.

1 to 8 Milliampere:
Sensation of shock. Not painful. Individuals can let go at will as muscular control is not lost.

8 to 15 Milliamperes:
Painful shock. Individual can let go at will as muscular control is not lost.

15 to 20 Milliamperes:
Painful shock. Muscular control of adjacent muscles lost. Individual cannot let go.

20 to 50 Milliamperes:
Painful, severe muscular contractions. Breathing difficult.

100 to 200 Milliamperes:
Ventricular Fibrillation,
A heart condition that results in instant death. No known remedy.

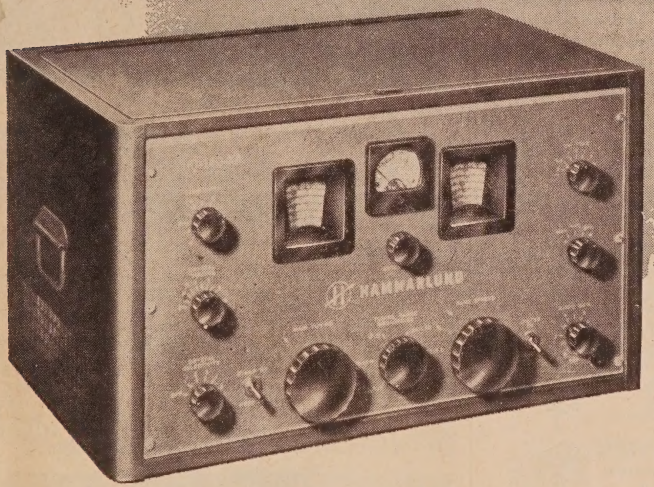
200 and over Milliamperes:
Severe burns, severe muscular contractions—so severe that chest muscles clamp the heart and stop it during duration of shock. (This prevents ventricular fibrillation, and is the reason why victims sometimes survive when hit by extremely high voltage.

From the above you can see that unless your body resistance is higher than about 5,000 ohms contact with 440 volts would be FATAL.

A. W. McAuly, Supt.
Electrical Dept. Ret.
Edgewater Steel Company
W3CEO

Now better than ever!

the New HAMMARLUND HQ-140-XA



- ★ Continuously tunable from 540 KCS to 31 MCS with adequate selectivity to separate crowded signals.
- ★ Extremely high signal-to-noise ratio and positive noise limited for full use of receiver's high sensitivity.
- ★ Crystal filter provides extreme selectivity for high adjacent signal rejection.
- ★ Band-spread tuning on the four higher frequency ranges with direct calibration for the 80, 40, 20, 15 and 10 meter amateur bands.

A great receiver made better—that's exactly what Hammarlund has done with the new HQ-140-XA.

The new HQ-140-XA offers many new and exciting features—higher usable sensitivity—new, smooth-as-silk tuning with improved dial markings for greater accuracy—further refinements in the already fine superheterodyne circuitry—full 2-watt undistorted audio output—and many other advances.

The only way to appreciate what Hammarlund has done with the HQ-140-XA is to see it, touch it, try it. You'll be surprised to see how much better the "best" is now. Ask your supplier for complete details, or write for Bulletin C-956.

AT A NEW LOW PRICE **$249.50**

HAMMARLUND MANUFACTURING COMPANY, INC., 460 West 34th Street, New York 1, N. Y.

Established 1910 INTERNATIONAL DIVISION: 13 East 40th Street, New York 16, N. Y.

ONE DAY Processing!.



FA-9 CRYSTALS

For AMATEURS—
EXPERIMENTERS 1500 KC to 50 MC

Wire mounted, plated crystals for use by amateurs and experimenters where tolerances of .01% are permissible and wide range temperatures are not encountered.

CIRCUIT: Designed to operate into a load capacitance of 32 mmf on the fundamental between 1500 KC and 15 MC. Designed to operate at antiresonance on 3rd overtone modes into grid circuit without additional capacitance load. 5th overtone crystals designed to operate at series resonance. **(Write for recommended circuits)**

Prices Pin Diameter .093"
Pin Spacing .486
(FA-9 Fits Same Socket as FT-243)

FREQUENCY RANGE	TOLERANCE	PRICE
1500-1799 KC	.01%	$ 4.50
1800-1999 KC	.01%	3.90
2000-9999 KC	.01%	2.80
10000-15000 KC	.01%	3.90
Overtone Crystals—3rd Overtone Operation		
15 MC-29.99 MC	.01%	$ 2.80
30 MC-54 MC	.01%	3.90
Overtone Crystals—5th Overtone Operation		
55 MC-75	.01%	4.50
76 MC-90 MC	.01%	6.50

PRECISION CRYSTALS
COMMERCIAL USE
F-6 SERIES
1500 KC — 50 MC

NOTE: The FA units will not necessarily have the correct correlation for Commercial use.
For commercial applications, the F-6 type unit should be used. Write for details!

ONE DAY SERVICE! Crystals are sold direct, for fastest possible service. When cash accompanies order, International prepays Airmail postage; otherwise, shipment made C. O. D. Specify exact frequency and crystal will be calibrated to .01% or better of this frequency.

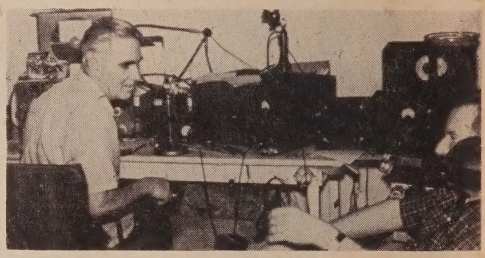
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CRYSTAL MFG. CO.
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Bermuda

Dear Wayne:

My 23-day air cruise combined a holiday very different from any I had ever taken before and allowed me to meet some of the many amateurs I have QSO'd. Visited and toured were: Puerto Rico, St. Croix, Barbados, Grenada, Trinidad, Tobago, Venezuela, Colombia and Jamaica.

I left Idlewild airport on Friday at 8:30 a.m. and five and a half hours later our plane let its wheels down on the new San Juan airport. Although I was to be there only 2 hours my good friend, KP4BU and his XYL were on hand to greet me. I had only time to look around the new airport before leaving for St. Croix. KV4BB and KP4BK, who are CAA Engineers, were on hand to greet me when I arrived. My QTH was the *Hotel On the Cay* at Christiansted. After 2 days in St. Croix I returned to San Juan, where, true to his promise, KP4BU and XYL were on hand to greet me for the second time. I had 4 hours between planes, so Luke took me to visit some Hams, dinner at his house and then off for Barbados, where I visited and swam for 5 days.



VP9BN

At Barbados, I stayed at the *Crane*, some 14 miles from Bridgetown, but in spite of that, saw a great deal of VP6LN, who bent over backwards showing me around this wonderfully scenic island, including a whole afternoon at the Carrington Station of Cables and Wireless which I wouldn't have missed for anything.

My next stop was at the mountainous and scenic island of Grenada, where another 5 days was spent, and here VP2GX, Mr. Palmer, the Educational Officer, and his 17-year old son, Allan, VP2GW, made my stay a pleasant one, with more than the customary round of sightseeing and visiting of friends. Grenada was much more punished by hurricane Janet than Barbados because of the torrential rains accompanying the 125-mile gales. Cables and Wireless were off the air for days, and it was here that the Grenada Radio Club did themselves proud in establishing necessary communication. The island of Carriacou was practically leveled, and it was chiefly thru the heroic efforts of Mr. Palmer, VP2GX, that this isalnd was fed. He chartered a sloop to take them food and supplies and established radio communications.



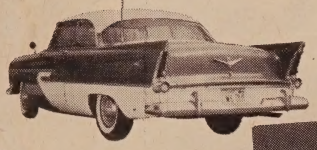
VP9BU

I then continued on to Trinidad where my good friend VP4LW was on hand to greet me and make my stay interesting by taking me out for an all-day trip by auto to the famous Pitch Lake. The next day I visited scenic Maracas Bay, had a chat with VP4TI and then was off to that beautiful island of Tobago which boasts of no radio, no TV, and no Hams, only beauty and grandeur with miles and miles of coconut tree fringed beaches. I did nothing but swim and take many pictures, both Kodachrome and black and white with my 2 *Nikons*.

[*Continued on page 108*]

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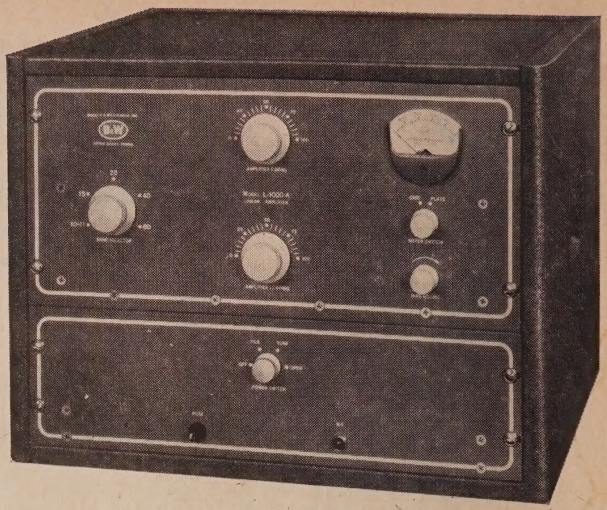
Visible a quarter of a mile away in the dark! Weatherproofed adhesive backs. Complete set at our cost, only 50 cents. (Worth $1.50.) Your distributor has "Call Letter Coupons" or can get them from Davis Electronics.

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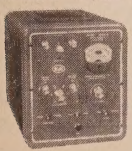
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Receiving Tubes in Grounded Grid SSB Finals

Norman R. McLaughlin, W6GEG
4143 Muirfield Road
Los Angeles 8, California

Need for a grounded grid driver that would handle 100 watts input started a search of receiving tubes. Receiving tubes offered possibilities beyond mere economy. A requirement of this driver is a low impedance input which is not normally found in transmitting type tubes.

Since the output impedance of the 20A must remain fixed, unless a major overhaul is undertaken, it seemed reasonable to design the stage it would drive for an input impedance to match the 20A output. This might mean two, three or four receiving tubes that would (1) provide the required rated plate dissipation and (2) supply a load of something like 50 ohms across the 20A output.

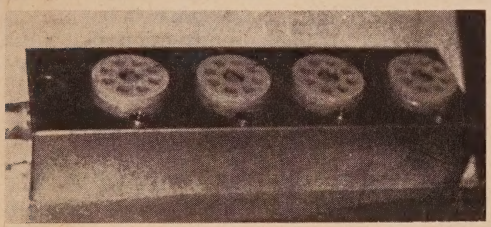


Fig. 1—An undressed 6AG7. Power handling capabilities of this tube belie its rather fragile appearing construction. The wide spacing of the plate accounts for its unusual voltage handling capabilities.

Because 6L6's rated plate dissipation is 21 watts and they were handy, they were the first selection. A test chasis, *Fig. 1,* was made up and wired, *Fig. 2.* It was set upon the chassis that had both a 750 volt 300 ma. power supply and a plate tank circuit built into it. With this arrangement characteristics of from one to four 6L6's could be studied by the mere expedient of plugging in the proper number of tubes.

On 75 meters, where these tests were made, power input without plate discoloration is just about proportional to the number of 6L6's paralleled. Drive required, however, is less than proportional. This condition suggests that the match between the 20A and driver stage is improved as tubes are added, allowing for a better transfer of power.

No means was available for measuring the actual drive applied. Settings of the speech level potentiometer, however, indicate that with four 6L6's in parallel optimum output is obtained with less than four times the speech level required to drive one 6L6 to similar output. In no instance has it been necessary to set the speech level higher than 10 'oclock. At this setting, the indicated peak input to four 6L6's is 300 watts.

Other members of the 6L6 family were given similar tests. The 5881, 6L6GB and Western Electric's sturdy 350B were plugged into the test chassis. The former two tubes appear to have identical characteristics to the 6L6. Static plate current, peak plate current and ease of drive are identical.

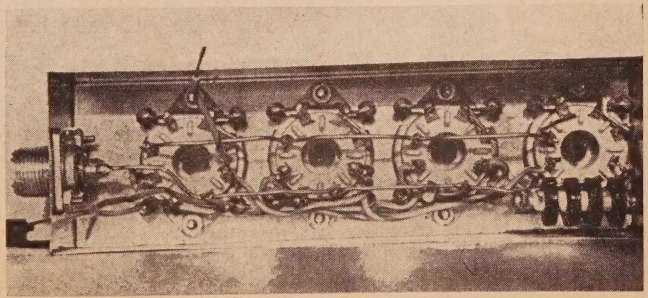


Fig. 2—Underside of the test chassis. The rubber covered wires carry heater current and the ground connection. The pate connection is on the right just above the RF choke. The RF choke is between cathodes and ground.

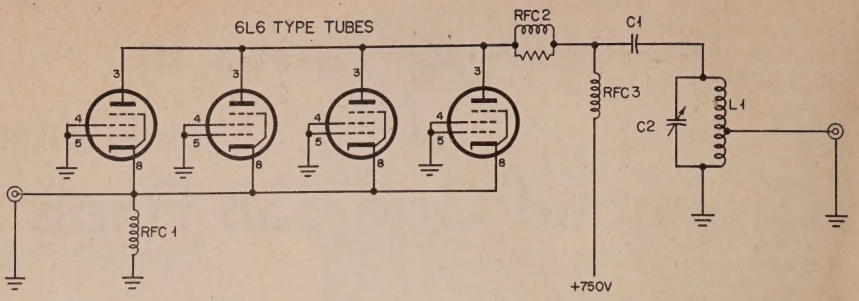


Fig. 4—The basic schematic of the test amplifier using 6L6 type tubes. Sockets and/or socket connections were changed when 6AG7's and 6C16's were tested. Other circuit values remain unchanged.

The 350B varies considerably from its smaller cousins. Its μ is considerably higher, it drives more easily but, albeit, it is wild. In the course of tests, a faint cross-hatch appeared under modulation on Channel 5 when a TV set some 30 feet away was turned on. None of the other tubes put a trace of TVI on any channel.

Doubtless this condition can be corrected by means of a different parasitic choke. However, since the 350B draws 1.9 amperes on its heaters four of them put a severe overload on the filament transformer available. This fact, plus a feeling that even better tubes might be found, brought tests with 350B's to an end without a solution to the parasitic emission problem.

For those who like to fuss with such problems, the 350B might be a worthwhile undertaking. It is a big, sturdy tube in an envelope approximating the 5U4G. It has a husky plate and handles inputs considerably in excess of the 6L6 series without color. It drives more easily, too, due to its higher μ, and might be well worth taming.

Enthusiasm for this tube and other members of the 6L6 family is dulled somewhat when inter-electrode connections are considered, *Fig. 3*. Note that the suppressor grid is connected internally, to the cathode. Since the cathode is the driven element, *Fig. 4,* this puts drive on both sides of the control and screen grids.

It is the shielding of these grids that precludes necessity of neutralization in grounded grid amplifiers. Obviously, when drive is applied on both sides of the shield, regeneration might very well develop. While these problems did not assert themselves on 75 meters, regeneration could be serious on other bands.

The tube manual was consulted and a new tube requirement was added. The suppressor grid must be independent of the cathode. Among the several tubes available, the 6AG7 and the 6CL6 seemed most attractive. While they lack the plate dissipation available in previously tested tubes, they are the sturdiest of tubes of this type whose suppressors are brought out to base pins, independently of cathodes.

Sockets of the test chassis were re-wired to accommodate the 6AG7's. A similar chassis was made up for the 6CL6's. Pins 2, 3, 7, 8 and 9 of the 6CL6 sockets were bent over and soldered directly to the chassis. This elimination of leads caused thoughts to wander into using such a configuration on 6 or 2 meters. So far as short leads are concerned, this is it!

Four 6AG7's were tested first. With 750 volts on their plates, static plate current is approximately 12.5 ma. With the speech level remaining at the point where 6L6's talked up to 400 plate mils, the 6AG7's astonishingly, pinned the 500 mil meter! Speech level was reduced to where peak current was 250 mils and the tubes seemed to run no hotter than the two operating in conventional Class A in the 20A exciter.

Since 6AG7's are metal tubes it is not possible to observe plate discoloration. So, tubes were operated for approximately thirty days under severe conditions. They were purposely abused far beyond what might be expected in anything less than disastrous conditions.

Upon checking them on a tube checker, transconductance readings of three of the four 6AG7's came up to exactly the same figures as when they were originally tested by the same meter. The fourth tube was down about 10%. This difference in reading may have existed prior to these tests, since it is recalled that one of the four tubes did originally test a little below the others.

This amazing ruggedness was discussed on the air with W6ZXY. He decided to run some shake down tests of his own to determine exactly how much 6AG7's would stand. He rigged up a pair of them and his findings are even more astonishing!

Summed up, he found that the pair of them did not break down with 1,250 volts on their plates. At 250 ma. plate current, which is the limit of Mac's power supply capacity, the tubes operated no hotter than do the 6AG7's in the output stage of his 20A exciter. During these tests which covered some period of time, output remained constant and tubes showed no signs of deterioration.

At 1,250 volts on the plates static current for two 6AG7's was approximately 5 ma. The power gain, under these conditions is terrific. Neither instability nor parasitic emissions developed.

As a result of these tests, Mac is of the opinion that 6AG7's in grounded grid require no more drive than in conventional circuitry. He found the power gain to be so great that he was unable to use the 6AG7's as a driver to his conventional parallel 4-400A final and stay within legal power input! With his 20A speech level as low as it could be set, and with one 6AG7 removed from the 20A output stage, Mac was still unable to keep the 4-400A input under a kilowatt!

Because of this exceptional performance and sturdiness, curiosity over what was inside the little iron jug became overwhelming. So, a 6AG7 was decapitated and its very ordinary looking construction, *Fig. 5*, makes its high performance all the more incredible. Its fragile appearing plate structure, the suppressor grid that resembles an after thought belie the 6AG7's ability to take it.

Since the 6CL6 is the miniaturized version of the 6AG7, it was next tested. With 750 volts on their plates their performance is identical to the 6AG7. No tests have been made at higher plate voltages and whether the 6CL6 will hold up as well as the 6AG7 at 1,250 volts can only be surmised.

However, in normal speech, no plate discoloration takes place when voice peaks drive plate current up to 250 ma. for four tubes. As with the 6L6 type tubes, discoloration does take place when very long oohs and aaaahs hold the plate meter at that figure.

Because of their compactness, the four 6CL6's were chosen for the W6GEG driver stage. The test lashup is still in use, having undergone over two months of 75 meter operation and the little tubes still perform in excellent fashion.

Driven by a 20A they have been pushed to 380 mils plate current when full carrier was inserted. Needless to say, they begin to blush

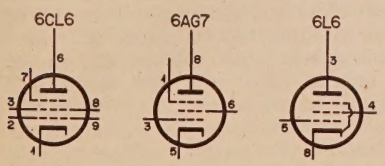


Fig. 3—6L6 type tubes have suppressor grids internally connected to the cathodes. Thus, drive is applied on both sides of the control and screen grids, pins 4 and 5. While no harmful effects occurred on 75 meters, problems might develop on higher frequencies. Suppressors in the 6CL6 and 6AG7 are independent of the cathodes, being brought out to pins 7 and 1 respectively.

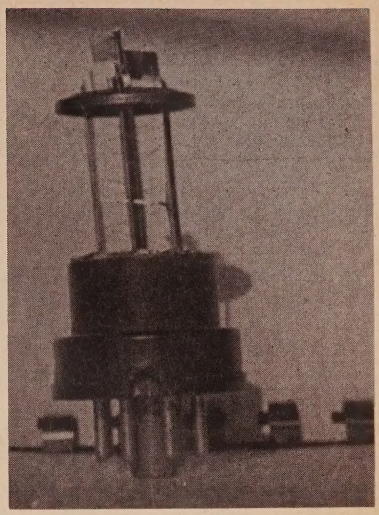


Fig. 5.

after about 5 seconds of such input. In actual operation, however, the speech level of the 20A is set at the point where plate current peaks, under modulation hit 200 mils.

This 150 watts input has done such a good job of getting out that progress on the 4-1000A final they will ultimately drive has slowed down to a walk. It has been difficult to revive the urge for the big bottle when these 6CL6's put out so well.

Throughout all of these tests, output was checked on a Panadaptor. Signal patterns were closely studied and despite the man sized inputs to boy sized tubes, patterns remained clean. No evidence of limiting was noted.

On the air checks resulted in excellent quality reports. Little difference is noticeable as between 6L6 type and 6AG7 type tubes so far as signal quality is concerned. Drivewise, however, the 6AG7 type gets the nod because of its lower requirement.

A *10A, 20A* or SSB exciter of equivalent output has drive to burn for 6AG7 type tubes. During these 75 meter tests and currently, the 150 watt input to the 6CL6's is obtained with the speech level of the 10A set at 10 o'clock. With the 20A the same output is obtainable with the speech level at 9 o'clock. The microphone is a *Turner* 80X.

From the standpoint of both economy and compactness the 6AG7 and the 6CL6 respectively afford great opportunities. The 6AG7 is a war surplus tube and can be bought quite cheaply. The small size of the 6CL6 suggests all sorts of mobile, portable and VHF applications. ■

Parts List

RFC 1, 3—2.5 mh 500 ma. RF Chokes
RFC 2—1 watt 50 ohm resistor wound end to end with No. 16 enamel covered wire
C1—500 μμfd. 10KV ceramic (TV type)
C2—Johnson 200L15 202 μμfd. .030″ spacing
L1—B/W 40 JEL, for 75 meters. Tap about 4 turns from bottom



Lloyd D. Colvin, DL4ZC

Lt Colonel, Signal Corps, U. S. Army
4th Signal Group
APO 403, NYC, NY
(ex W6TG, FA8JD, W6ANS, KL7KG, W6IPF, J2AHI, W6KFD, K2OC, JA2KG, W2USA, K4WAB, J2USA, W7YA, W6AHI, W7KG, JA2US, W4KE)

25,000 QSL's



The sending and collecting of QSL cards is an interesting and fascinating part of amateur radio. It might also be described as a controversial part of amateur radio. The individual attitude varies greatly. Almost all amateurs are very happy to receive their first QSL cards. As the novelty wears off and it is found that QSL's require a considerable amount of time and some money, the eagerness to QSL decreases. A few amateurs promise to QSL, but never quite find the time to "catch up" with their QSL chores. Others send cards only to DX stations worked, while some never lose their interest in QSL's and establish a policy of QSL'ing one hundred percent.

The author is one of the latter class. The sending of at least one QSL card to every station worked in the last 27 years has resulted in a collection of QSL's numbering approximately 25,000. This represents confirmation of QSO's under 18 different calls, from four continents.

All QSL's are filed alphabetically in the metal file cabinets shown in the picture. The individual drawers measure 5″ by 6⅜″ by 15¾″. These cabinets are available from most office supply stores and are excellent for this use.

The cabinets may be placed near the station operating desk where the operator can pick out any desired card in a few seconds. This is especially handy when tuning the bands and it is desired to see if you have a card from a certain station. This method will permit you, when contacting an amateur that you originally worked several years ago, to immediately call him by first name and discuss various information on his QSL card.

If desired, cards listing the call and date of QSO for station worked, but who did not QSL, may be filed alphabetically with the QSL's received. In this manner a complete card file of all stations worked may be kept with a min-

imum of time and effort. If this method is followed the work involved may be further simplified by not making up and filing cards for non-QSL'ing stations until one year after the QSO. By this time the chances of obtaining their QSL cards are getting slim.

Never give up however on the possibility of obtaining a QSL. Cards are often received many years after a QSO. The writer recently received a QSL from W6CYV 22 years after the original QSO.

The matter of percentage of QSL's received is one that is frequently discussed and many articles have been written on it.

A tabulation of QSL returns obtained by the author from several of the most active amateur call areas of the world follows:

CALL AREA	NO. STATIONS WORKED	% QSL RECEIVED
OK	178	89%
EA	292	88
YU	228	84
OH	294	83
SM	420	82
DL	852	81
ZS	282	79
I	348	78
W1	1024	76
G	1094	75
VE	1078	75
W9	1430	75
LU	250	75

CALL AREA	NO. STATIONS WORKED	% QSL RECEIVED
WØ	994	73%
VK	700	73
KL7	232	73
W3	958	73
W8	1062	71
W7	1504	70
F	374	69
PA	180	69
PY	200	69
KH6	180	68
W6	1846	68
JA	314	67
W5	1066	66
W4	1448	66
USSR (UA thru UR)	184	61
XE	66	59

The large number of cards make the tabulation interesting and accurate. It is possible however that the fact that the author operated part of the time from DX locations, always sent QSL's to all stations worked, and spent 3½ years as a QSL manager, may result in percentages higher than would normally be expected.

A survey of QSL cards at any amateur station will produce many unique and unusual cards. The author's own recommendations as the most interesting of several types received are:

Most Modernistic—W6RW (universe with call in background)
Most Effort—11TJD (all hand-made)
Funniest—W4—(had terrible fist—when QSL received had picture of monkey at key)
Prettiest Group—Swedish "SL" Military Stations (beautiful multicolor cards with military crests and flags)
The Doggiest—G3DOG and W6BOW (Photos of dogs on QSL)
The Cattiest—W8KAT (cat on QSL)
The Largest—W2APF (6¼" x 9¾")
The Smallest—CN8BV (1½" x 2½")



The Author and a couple of his QSL's

The Most Risque—W6YI (can only be sent through mail in envelope)
The Most Pointed—W2BO (picture of lifebuoy soap on QSL)

When you have visitors at your station, either amateur or non-amateur, it is difficult to properly display and discuss cards filed in cabinets or on the wall. A method that proves very satisfactory, but requires some work (page the XYL) is the filing of certain cards or groups of cards in albums. Standard large size photo albums can be used satisfactorily. In the photograph the author is holding such an album in which one card from each of the 243 countries worked has been placed. This album makes a fine topic of discussion for all visitors and may readily be taken on trips or any place desired.

[*Continued on page 102*]



E. L. Klein, W4UHN
5902 Brunswick St.
Springfield, Va.

applications and components for Etched Circuit Boards

One approach to the adoption of different technique, is through the evaluation of its past applications. By studying areas where a design or construction method has previously been successfully employed, one may better anticipate results which could be expected of it in new applications.

Thus, with printed circuits, we may better envision uses to which they may be put in amateur and other experimental work, by first reviewing some of their present commercial applications. It is for that reason that this pictorial summary has been assembled.

Radio and Television

Since about 1950, when etched circuit boards first appeared in broadcast receivers, significant advances have been made in their employment in the field of radio and television, and in industrial instrumentation. Similarly, advances have been made in the design of individual components so as to make those components more compatible with etched circuit boards with which they are used.

Perhaps the greatest motivation given to the adoption of printed circuits, and in particular,



Etched circuit boards of the type used in modern television receivers. The 231 components shown are soldered in a single dip, compared with 428 hand soldered connections formerly required by manual assembly. Representing over 75 percent of the wiring in a typical television receiver, printed circuits also play a vital role in making possible other forms of automation in the assembly of electronic apparatus.

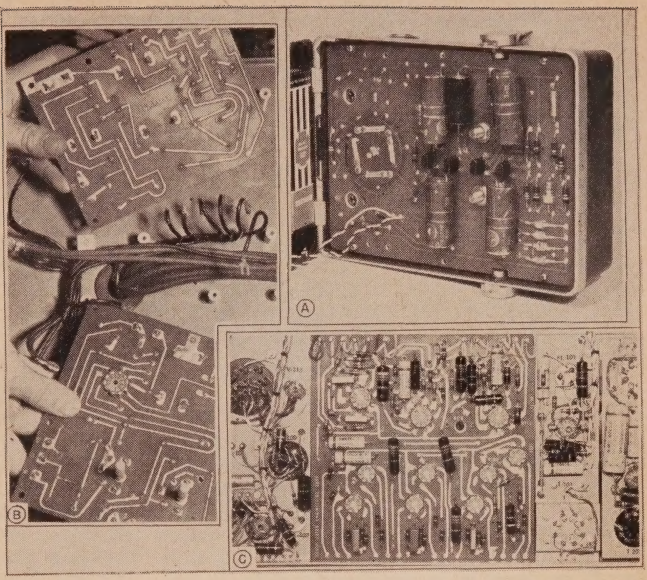


Fig. 1. Etched circuit boards are finding increased industrial applications. At left, the use of printed circuits is shown in a new simplified full-wave thyratron adjustable speed motor drive. At right, above, a battery operated vibration measuring instrument is opened to show the circuit board, transistors and other components including a printed circuit selector switch next to the hinges. Below—Bottom view of an analog-to-digital converter (voltmeter) showing etched circuit board and other wiring.

etched circuit boards, is the promise they hold for automatic production. While the amateur may not consider such automation as his principal interest, he does, nevertheless, benefit from the greater selection of specialized components which have thus been made available. Typical television applications of etched circuit boards are shown (that's what the girl is holding), and several configurations of circuit arrangement and wiring in the familiar AC-DC radio are displayed in Figure 2. It will be noted that a variety of methods are employed for making connections to the tube sockets, i-f transformers and other components. In each case, the connection is designed to be suitable for mass production dip soldering. Changes in component design to satisfy this method of construction will be described later.

Industrial Applications

Etched circuit boards have not been limited in use to radio and television receivers, although that field by far accounts for the largest volume. Industrial applications such as in motor speed control, product counting, quality control, and item selection and segregation have proven practical and desirable. In systems requiring a large number of circuits of duplicate design, etched circuits are particularly valuable. Electronic computers, for example, could not be produced so uniformly nor as economically if this technique were not used. Figure 1 shows several examples of etched circuit boards in industrial applications.

Special Applications

Aside from the usual electrical conductor application to which etched circuit boards are normally put, the technique of etched foil is also applied to other unique uses. For example, strain gages made from etched foil as shown in Figure 3 can be accurately employed to convert very minute changes of mechanical stress into corresponding changes of electrical resistance. Heaters for the de-icing of aircraft leading edges have shown considerable promise when made of etched foil on a suitable insulating base. Interconnecting wiring for complex switching, flexible cable assemblies, organ tone generators and humidity sensing elements are but a few of the special applications to which etched foil techniques have also been put.

Printed Circuit Kits

One large use of printed circuits quite familiar to the amateur is the kits for home construction of test equipment and other similar

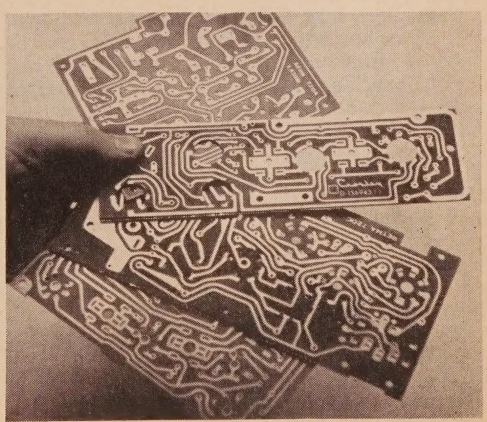


Fig. 2. AC-DC radios.

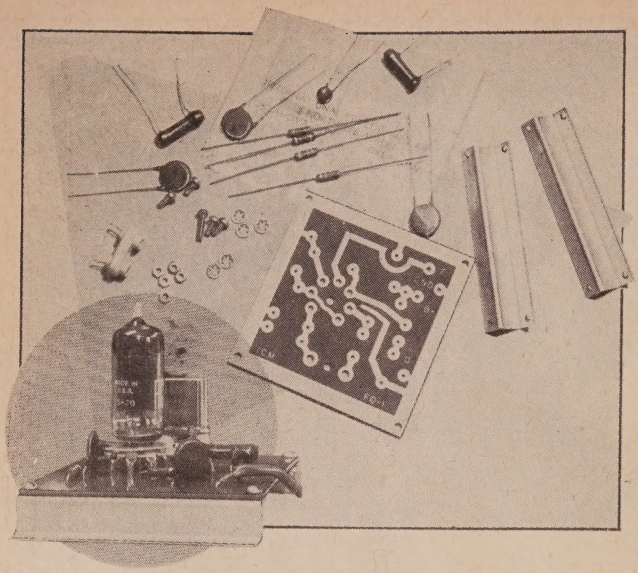


Fig. 4. This International Crystal crystal calibrator kit uses a factory made etched circuit board as its chassis. When being assembled, the components are inserted into the pre-punched holes according to instructions stenciled on the side opposite from the circuit pattern. Angle brackets are provided for convenience in mounting the unit within existing VFO or receiver cabinets.

equipment. These kits greatly simplify the mounting and wiring of parts and have done much to acquaint engineers and technicians with the merits of printed circuits. Examples of such kits are shown in Figures 5 and 6. The term "kit" is also applied to kits of materials from which etched circuit boards and even conductive paint circuits and resistors are made. Still another connotation of "kit" applies to a kit of materials and tools used by servicemen for the repair of printed circuits in radio and television receivers.

Manufacture of Components by Etched Foil Technique

While etched circuit boards are primarily used for interconnecting wiring, the technique by which they are produced is likewise applicable to the manufacture of individual electronic components.

Capacitors and Coils—as has been shown, foil, when bonded to a thin dielectric, can be etched to make conductive patterns which are useful in specialized applications such as strain gages, rain detectors and strip heaters, etc. Similarly, when the proper type and thickness dielectric is chosen, the foil on opposite sides of the dielectric or insulating base forms the plates of a capacitor. Figure 6A shows eight such capacitors as well as six groups of coils in a TVI filter. Radio frequency transformers having interwound primaries and secondaries are employed in the bifilar coils of the TV antenna coupler in Figure 6B.

Transformers—A unique method of manufacturing power transformers with etched foil bonded to a thin dielectric is shown and described in Figure 6C.

Switches—Switch wafers and their inter-

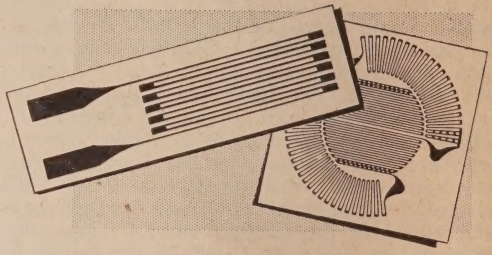


Fig. 3. Above; Strain gages.

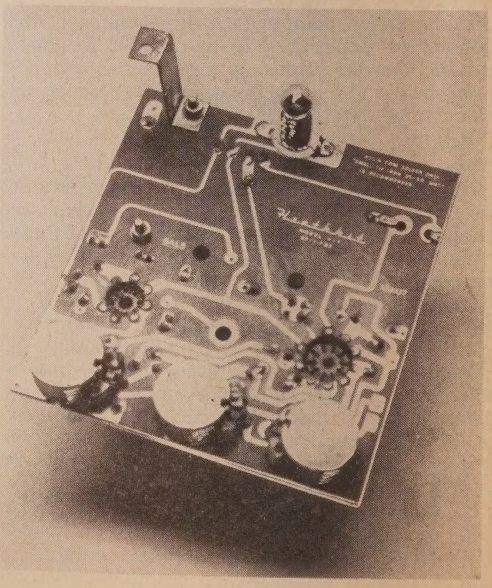
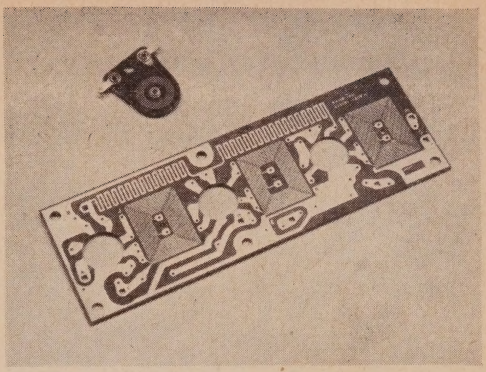


Fig. 5. Heath Kit VTVM kit.



Several unique coil configurations are shown here. The simple coil is a flat spiral with its inner lead connected thru the insulating base by means of a hollow rivet. The "zig-zag" pattern on the circuit board acts as an isolating RF choke in the heater leads between tubes. Close examination of the rectangular coils will disclose that they are actually transformers with both primary and secondary windings beginning at the lower left and ending in the center of the rectangle.

connecting wiring have been successfully made and used as shown in Figure 7. Flush wiping switch plates in which the nickel-rhodium plated contacts are imbedded in black melamine surfaced laminate are used for high speed or low torque applications. Contact bouncing is minimized in the flush arrangement. Raised copper conductors and contacts which are plated with silver, nickel, or rhodium have a life of up to 50 million revolutions when manually operated or under certain conditions up to 500 rpm. The advantages of printed switches are most fully realized when complex switching arrangements are required, for it is no more difficult to reproduce a complicated pattern than a simple one.

Components Designed for Printed Circuits

Practically all types of components have been or are being redesigned for use with etched circuit boards. Due to the large number of sizes, values and brands of components it is not practical here to attempt to describe all which are available.

Relocation of Leads—In general, the redesign of a component for etched circuit board application involves changing its leads from an axial to a radial configuration and repositioning both leads or terminals and mounting tabs in the same plane. Frequently small and light weight parts are mounted by their leads or terminals rather than by a bracket or terminal board as was formerly done. Brackets, bolts, nuts and rivets are thus eliminated. A descriptive example of this concept is shown in Figure 8 where all terminals of the relay are arranged in one plane and the relay itself mounted by those terminals.

Capacitors and Resistors—Tubular capacitors for use on etched circuit boards bear a close resemblance to their conventional counterparts. Figure 9 shows capacitors whose axial leads have been relocated so as to enter the same end of the capacitor. This configuration permits the component to occupy less space on the circuit board and makes it somewhat more adaptable to manifold feeding as required by automation. The preforming of leads and trimming to length thus eliminated introduces additional economies in materials and time.

Carbon resistors, being of smaller size and more rigid than tubular capacitors can, to some extent, justfy the extra operations of lead

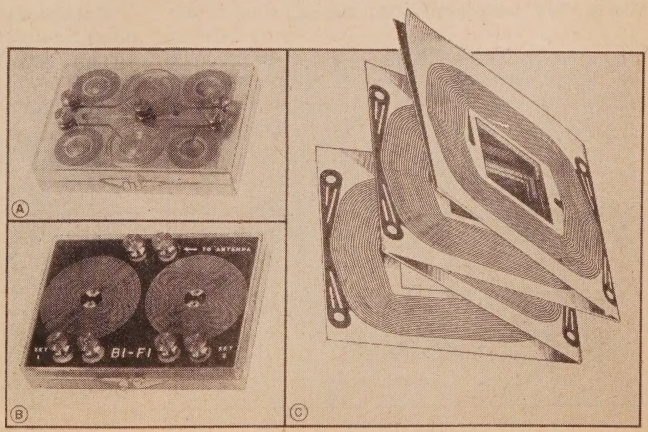


Fig. 6. At left, a three-pi TVI filter and a two-set TV coupler. The filter incorporates eight capacitors. At right, a unique method for making transformer windings. The conductive pattern is etched in the foil which is bonded to the paper-thin insulating strips. These strips are then folded by machine as shown to form a pile, and the center punched out to accommodate the core. Individual coils are formed into series windings by welding thru the insulation after the first fold is made.

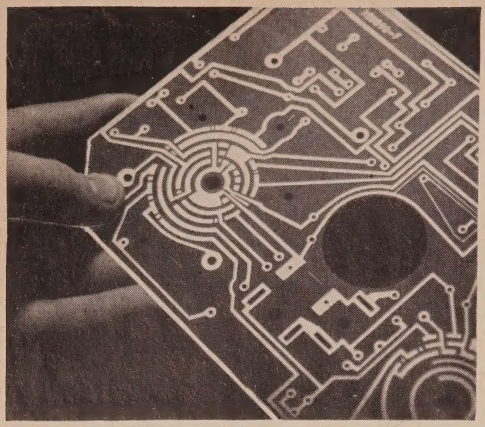


Fig. 7. (left) Rotary switch plates are readily made as integral parts of their interconnecting circuitry. Several examples of "non-shorting" spacers between contact surfaces can be seen. This switch will be completed by addition of a shaft, bushing, contactors and a detent mechanism.

preforming and trimming. Inasmuch as resistors also are not amenable to heat of soldering temperatures immediately adjacent to their molded case, the 90 degree bend in their leads aids in dissipating injurious heat.

Composite Units — Frequently composite units containing several resistors and condensers are selected for use with etched circuit boards. The "Printed Electronic Circuits" included in Figure 12 employ a type of printed circuitry different from the etched foil technique of etched circuit boards. Their conductors are formed by metallic base paints deposited thru a silk screen or by other pattern defining means. Figure 9 shows still another possible combination of two or more individual components whose combination was stimulated by printed circuits. Coils and condensers, coils and resistors or dual chokes molded into one rugged hermetically sealed unit are available in this form for use as diode filters, image traps, and series or parallel tuned RF circuits.

Coil Forms—Simplification of design and reduction of mounting hardware frequently result when components are redesigned for etched circuit board use. This is particularly true with the coil forms pictured in Figure 8. The slotted powdered iron tuning slug is accessible from either end and therefore space need not be left for an external lead screw. Available in several sizes and made of either phenolic or ceramic, these coil forms offer many advantages in amateur construction.

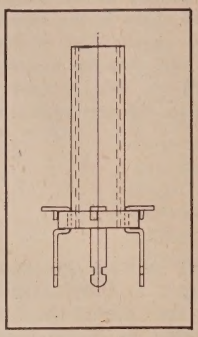


Fig. 8. This slug-tuned coil form is ¾ inch high and .219 inch or .285 inch diameter when made of phenolic impregnated paper. The companion ceramic form is ¼ inch diameter and either ⅝ inch or 13/16 inch high.

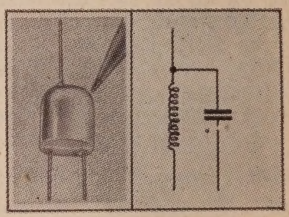


Fig. 9. One composite encapsulated unit well suited for use with etched circuit boards incorporates two components such as the coil and condenser in the above combination. Coils and resistors, dual chokes and other combinations are also possible in these hermetically sealed compact units. Applications include diode filter, image trap, or other series or parallel tuned RF or IF circuits.

Potentiometers—Compact single or multiple potentiometer units snap into place on etched circuit boards as shown in Figure 13. An added feature of this design is the ease with which the brackets and terminals can be

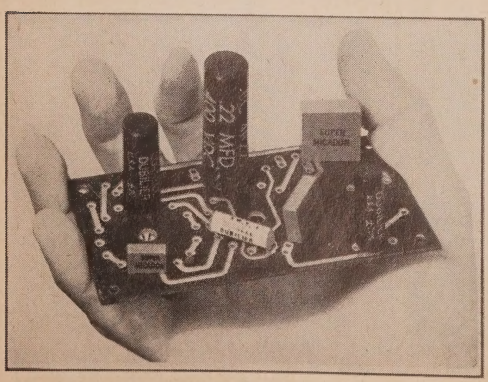


Fig. 10.

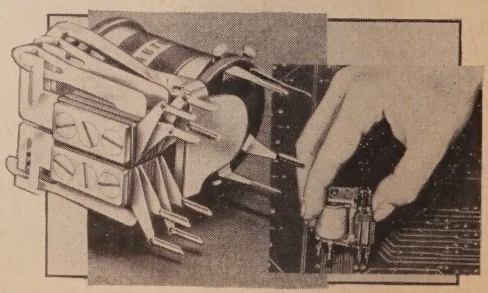


Fig. 11. Relay with plug-in terminals.

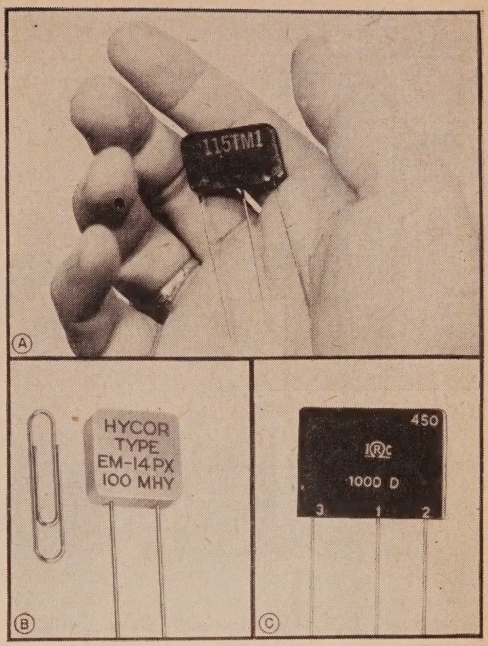
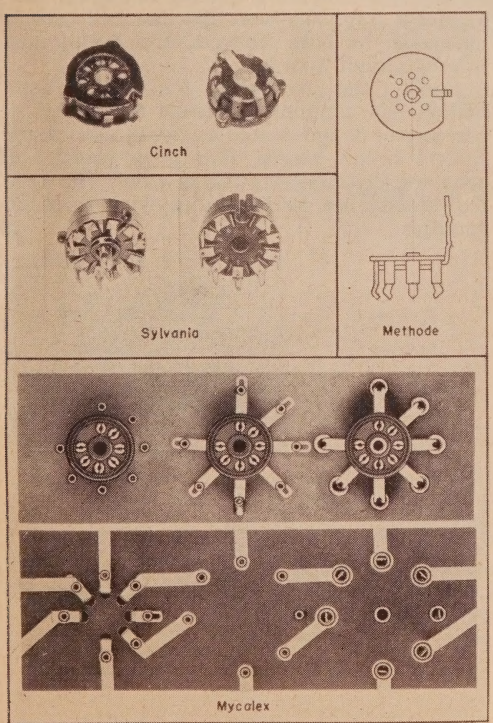


Fig. 12. Individual components frequently use printed circuit techniques. The "Printed Electronic Circuits" shown in A and C are vertical integrators consisting of three resistors and three condensers printed with conductive paint and resistive ink on a thin ceramic base. These as well as the miniature coil in B, are encapsulated or potted and are thus well suited for automatic assembly on etched circuit boards.

clipped when removing the potentiometer for replacement. Although shafts on the unit pictured are parallel with the board, other potentiometers of the convenional type with modified terminals are mounted with their shafts at right angles to the board. An example of such an arrangement was shown in Figure 5. One consideration to be given in selecting potentiometers for etched circuit boards is whether or not the control will be frequently manipulated and therefore if the board is sufficiently strong to support the control, especially if a long shaft is required.

Tube Sockets—A wide variety of tube sockets is available to the designer of etched circuit boards. One may choose to use conventional sockets or those specially designed for etched circuit boards. In cases where it is necessary to employ cross-overs between different terminals at the tube socket, it may be found that a socket using individual holes for each terminal is desirable. The sockets shown at the top of Figure 13 use a single mounting hole and therefore simplify the drilling or punching operations somewhat. If it becomes desirable to mount tubes parallel to the circuit board, angle tube sockets as shown in Figure 15 may be used.



Connectors — Connections between circuit boards as well as between circuit boards and other parts of the wired circuit are usually made with hook-up wire soldered permanently in place. This arrangement is satisfactory when it is not planned to frequently remove the circuit board. However, if for reasons of maintenance, flexibility, accessibility, unitization, etc. it is necessary to repeatedly connect and disconnect the circuit board, one of the special printed connector strips will prove most useful. Etched circuit boards possess a unique advantage here, for the male connector need only to be formed on one edge of the circuit board during the photo engraving operation. No separate male connector is necessary.

Fig. 13. Tube sockets have been redesigned for ease of insertion into etched circuit boards. Sockets at top, (Cinch) fit into a single ⅝ inch diameter hole. Next sockets, (Sylvania) feature keyway for holding and orienting in automatic assembling fixtures. At right, (Methode) connection for tube shield is provided. Below, (Mycalex) several other methods of connecting to the circuit board are shown.

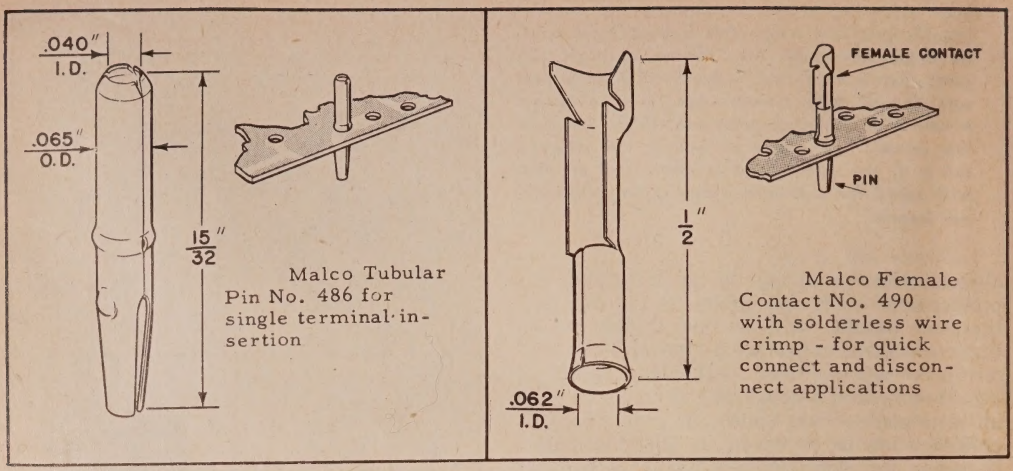


Fig. 16. Specialized hardware.

Individual connections may be made with the terminals shown in Figure 16. The tubular pins serve as a male plug or as a grommet or post into which the leads of a component may be inserted. Female contacts are secured to leads by means of solder or a solderless wire crimp. They fit neatly over the pin as shown at the right of the illustration.

Conclusions

In so rapid an advancing art as printed circuitry, any conclusions must of necessity be tentative and contingent. It can, however, be said that while the newly redesigned components enhance printed circuit design and production, they are not essential to successful individual experimentation. Conventional tube sockets, capacitors, resistors and coil forms all are capable of serving quite usefully in etched circuit applications subject to amateur construction.

Specialized components and hardware developed for printed circuits and used in radio and television receivers will not soon be found in abundance at local electronic supply outlets. This is because a conventional part can frequently be substituted when required in the due course of service work. On the other hand, we can expect to see continued changes in conventional components so that they will become amenable to both conventional wiring and printed circuit boards.

Finally, the inescapable demand for automation will continue to dictate the format of component design as well as circuit fabrication. Etched circuit boards offer great promise in economically satisfying this demand. The amateur should not be last in enjoying their advantages. ■

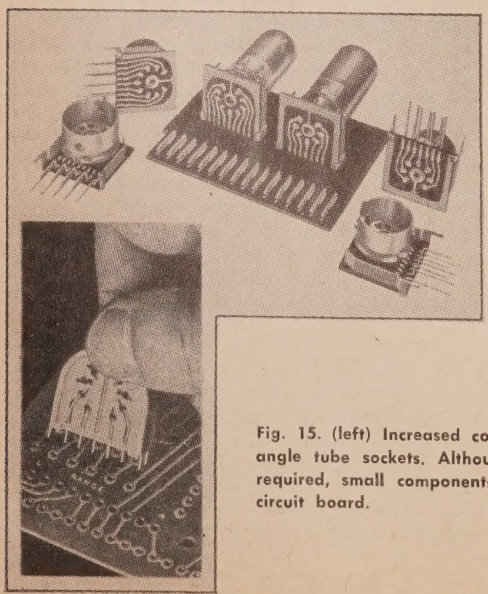


Fig. 15. (left) Increased compactness can sometimes be achieved by use of right angle tube sockets. Although two to three times as much circuit board area is required, small components can sometimes be mounted between the tube and circuit board.

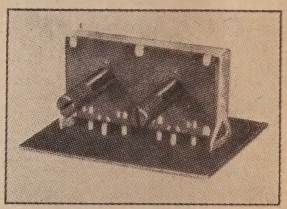
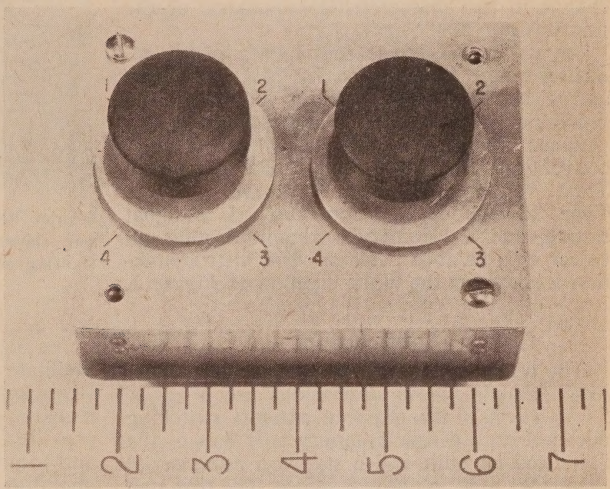


Fig. 14.

A Dual Coaxial Switch



Exterior View of Switch. Operation: Pull out, turn to next position, push in.

Donald H. Edman, W3ZYB
Solomons Island, Md.

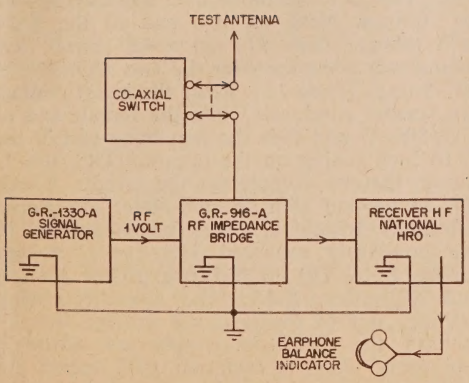


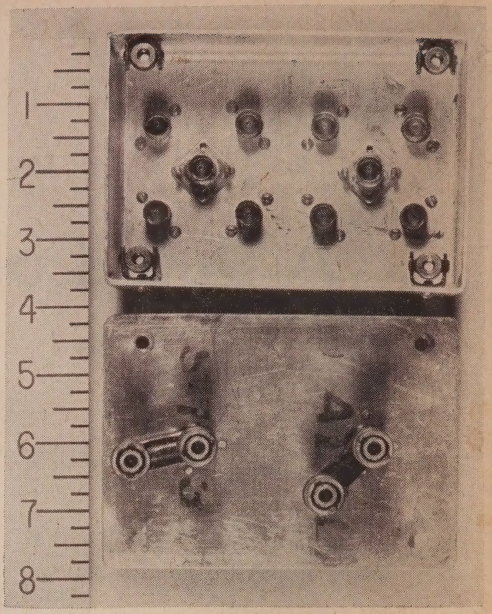
Fig. 2. Measuring Impedance of Coax Switch.

Experimenting with various antenna configurations has been interesting and enlightening to me. One of the problems that I was confronted with in antenna comparison work, was an efficient antenna switching network. At the outset, I thought it would be adequate to employ standard alligator clips soldered at the transmitter end of the RG/59/U coaxial cable feeding the antennas. The alligator clip arrangement worked well when only two antennas were being compared for signal strength on 80 meters. However, the method that I was employing proved especially time consuming and generally low in efficiency, and the switching problem remained acute. The difficulty was

compounded when I attempted to make the same comparisions on 40 meters. Of course, this made another approach on the antenna problem imperative, since I installed still another (vertical) antenna in addition to a dipole, long wire, "V," etc. Alligator clips were no longer adequate. After searching the surplus market for a coaxial switch within reach of my "ham" allotment, I was no closer to a solution. At this point I decided to develop my own antenna coaxial switch.

To keep the cost on a reasonable level, the switch was built from standard, readily available stock items. Considerable time on design and construction, coupled with bench testing, produced a reliable, convenient coaxial switch. In addition to its switching properties, the unit offers complete r-f shielding with little or no change in the characteristic impedance of the transmission line.

Several impedance measurements in the frequency range from 3.7 to 7.2 Mc., both with and without the coaxial switch, showed no appreciable change in the characteristic impedance. These measurements were made by conventional methods, using a General Radio Type 916A r-f Bridge, a General Radio Type 1330-A Signal Generator as a signal source, and a commercial communication receiver as a balance detector. The instrumentation is shown in the block diagram of *Figure 2*.



Interior View of Dual Coax Switch. Upper: inside of box showing r-f fittings. Lower: Underside of cover showing switching arms.

Construction

The dual coaxial switch was built on a homemade chassis whose dimensions are 1⅞" × 5" × 3⅝". If the required antenna switching does not exceed four antennas only half of the unit need be built and a standard commercial chassis 2" × 4" × 4" will suffice. The first step in construction of the coaxial switch consists of laying out the positions of the UG/414/U (*Items 13 & 19*) bulkhead adapters. Using a scribe, carefully mark the various holes to be drilled. The importance of mechanical alignment in producing a smooth-working unit cannot be over emphasized.

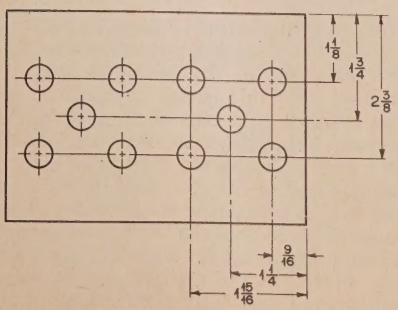


Fig. 3. Layout for Holes in Chassis.

An exploded view is shown in *Figure 1* to facilitate assembly. Caution should be used when mounting *Item 13* to ensure that the flange is inside the chassis. This is necessary to provide a bearing surface for the switching arm and to prevent the arm from disengaging when operating. The position detent guide, *Item 5* should be aligned to correspond with the four positions. The detent grooves may be filed easily, since the tubing is brass, and the base may be soldered on. If a lathe is available, this position detent guide can be readily turned in one piece. Upon completion of the above, file an indenture at one end of the ½ inch tubing (*Item 9*), to a depth of approximately ½ inch. This is to accommodate the UG/306/U 90° fittings. Next cut one end of the 7/16 inch tubing (*Item 11*) on a 45° bevel; this tubing will telescope over the two UG/306/U 90° fittings (*Item 12*). Place the insert contact pin (center conductor) into the female end of UG/306/U and slide the remaining end of the 7/16 inch tubing on the opposite UG/306/U fitting, thereby completing the circuit. Check this connection with an ohm-meter for proper continuity. Insert the loosely assembled "H" in the previously mounted UG/414/U fittings (*Items 13 & 19*) to facilitate proper spacing and alignment. Solder the assembly, being cautious not to overheat the fittings, thereby melting the dielectric. Apply an adequate amount of solder to each end, then inspect the solder joints for electrical contact and physical

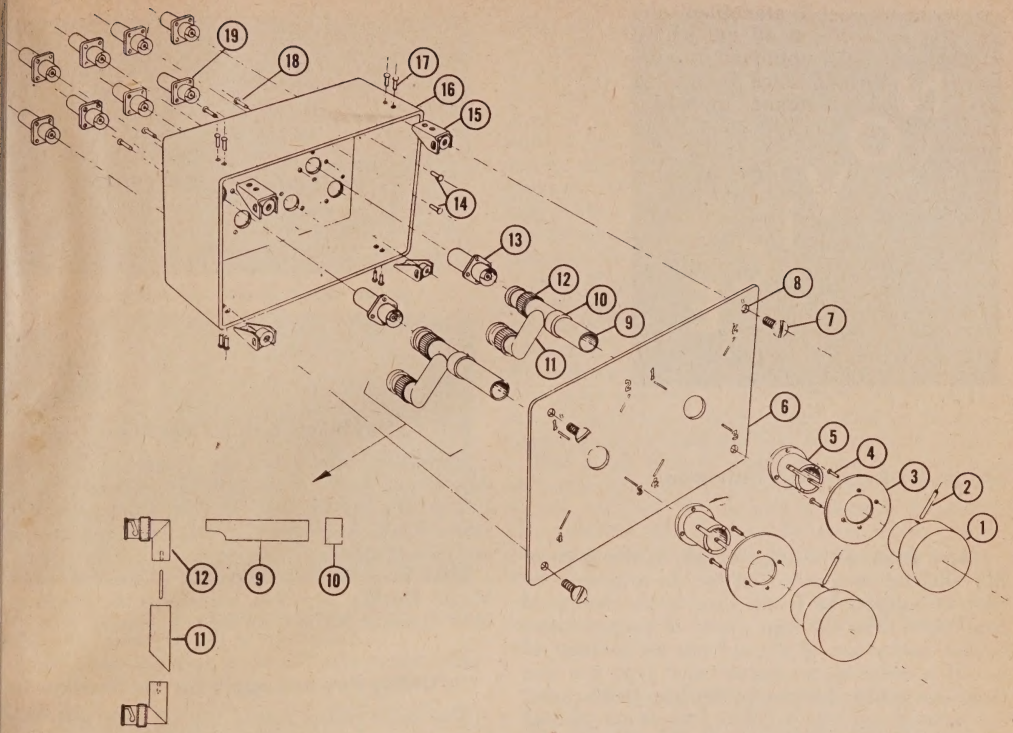


Fig. 1. Exploded View.

strength. Now with the switching arm complete, examine each fitting for proper cleanliness. The importance of cleanliness cannot be stressed too much as foreign matter can cause a lowered insulation resistance and increase the possibility of a breakdown (arc). ■

MATERIAL LIST

ITEM NO.	QUANTITY	SIZE
1. Knob, Selector	2 ea.	1½ inch Dia.
2. Pin, Retaining	2 ea.	1/16 inch Dia. ¾ inch long
3. Dial, Position	2 ea.	1/16 in. x 2 in. Dia.
4. Screws, Machine	8 ea.	4/40 x ¼ inch long
5. Position Guide, Detent	2 ea.	Telescopes #9
6. Cover, Switch	1 ea.	3⅝ inch x 5 inch
7. Screws, Machine	4 ea.	8/32 x ½ inch long
8. Hole	4 ea.	#8
9. Tubing	2 ea.	½ inch Dia. x 2⅛ inch long
10. Spacer, Ring	2 ea.	Telescopes #9, ⅜ inch long
11. Tubing	2 ea.	7/16 inch Dia. 1¼ inch long
12. R.F. Fittings	4 ea.	90 degree UG/306/U
13. R.F. Fittings	2 ea.	UG/414/U Bulkhead type
14. Screws, Machine	32 ea.	4/40 x ¼ inch long
15. Retaining Nut	4 ea.	8/32 inch
16. Utility Chassis	1 ea.	1⅞ x 5 x 3⅝ inch
17. Rivets	8 ea.	1/16 x ¼ inch long
18. Screws, Machine	8 ea.	4/40 x ¼ inch long
19. R.F. Fittings	8 ea.	UG/414/U Bulkhead type

CR7BS Activity

This letter came in from the secretary of CR7AR.

We have pleasure in advising you that, on the occasion of the visit of His Excellency the President of the Portuguese Republic to this province, the Liga dos Rádio Emissores de Moçambique (L.R.E.M.) will put its station CR7BS on the air during the big Economic and Cultural Moçambique Activities Show.

The station will work on every amateur band on phone or cw, as permitted by the propagation conditions, from the 7th August until the 31st October, and all of us will be very glad to contact any and every amateur all over the world.

All the communications will be confirmed by a special QSL card, commemorating this great event.

Southwest Missouri

The annual hamfest of the Southwest Missouri Amateur Radio Club will be held on September 9th at Fassnight Park in Springfield, Missouri. The program will include a swap table, basket lunch, and special activities for the XYL's. Prizes will be liberally distributed. The monitored frequencies are 3900; 29.62; 50.02.

NOVICE

for the Novice and the Technician

Walt Burdine, W8ZCV
Waynesville, Ohio

There is an old saying, "variety is the spice of life" and for sure, in no hobby can a greater variety of subjects be found than in the hobby of ham radio. The different types of people found in this hobby are of a great interest to most of us. Of a certainty, no matter what type you are, there is a double for you on the ham bands.

I actually ran into a fellow (no names please) that buys *CQ* and *QST* each month and then only reads the DX column. If you happen to be like this fellow, you are already gone. You really should read everything in the magazines that you buy, even the ads, for somebody has put a lot of work into giving you something of interest in each section. If there is a column that you think you don't like, try reading it anyhow.

The Novice Shack is still his favorite column says OM Donald Simmonds (13), Box 1149, Brownfield, Texas. Don works all bands except 11 meters, and will sked either phone or cw. His mother is W5FBM, dad is K5GEC and brother is W5CZW. Tonight is mom's night at the rig. Don's call is K5BDX.



Net News and Information

The Ohio Valley meets on Wednesday and Friday at 0600 CST, on 7161 kc. Contact NCS, Jimmy Duncan, KN4JGN, Post Office Box 26, Horse Cave, Kentucky, for information. Generals are also invited.

Dave Reinhart, KN8BPX, 1927 Madison Avenue, Mount Healthy 31, Ohio, announces the Northern Hills Amateur Radio Club for your roster.

Utility Power Supply for the Shack

This small power supply can be used with low power consuming circuits. This one has been used with converters, small oscillators, secondary standard oscillators, code oscillators, preamplifiers and other small pieces of equipment. It will deliver about 120 volts at 50 ma. and 6.3 volts at from .6 ampere to 2 amperes depending upon the transformer used. The selenium rectifier used in this model was a *Sarkes Tarzian* 65, this is a 65 ma. rectifier and is rated at 130 volts. My transformer was a small unit that was bought on the bargain counter, the choke being obtained from

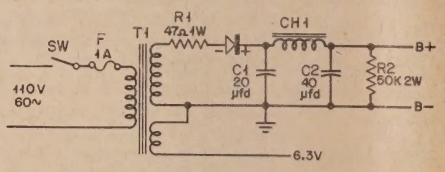
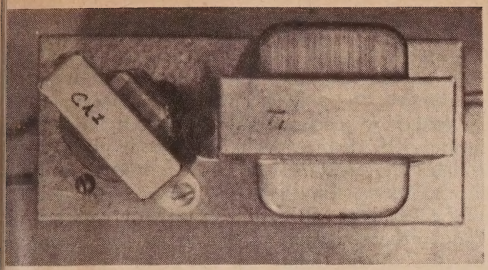
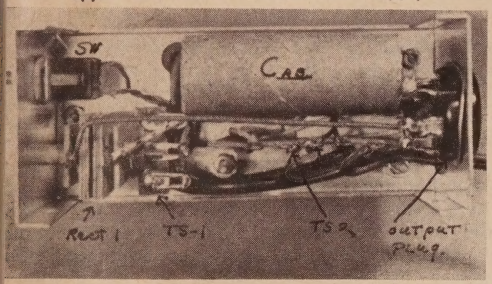


Diagram and Parts List of Power Supply

T—Any small TV booster power transformer such as the Stancor PA-8421 or Merit P-3045 or available substitute.
CH — Small AC-DC replacement choke. Stancor C-1003, 16 hy @ 50 ma.
R1—47 ohm 1 watt resistor.
R2—50k 2 watt. Can be left out if you do not need it.
C1-C2 — 40-20 μfd 250 volt dual tubular condenser.
1—Three point terminal strip.
1—Six or Seven point terminal strip.
1—Bud Minibox . . . CU-2104. (5" L, 2¼" W, 2¼" H).
1—1 amp pigtail fuse, mount on 7 point terminal strip.



Upper and Lower Views, Power Supply



the same source. The transformer and choke specified in the parts list will fit the chassis.

Good clean soldering joints will add to the neatness and usefulness of this power supply. Parts layout need not be followed, but good layout can be an aid to neatness in construction.

This unit is part of a projected plan for simple test equipment for the ham shack. It is presently furnishing power for the secondary frequency standard described in this column last month.

The Use of Mathematics in Ham Radio

The mathematics of radio seem complicated and various methods have been devised to help the newcomer to remember the numerous formulae used. Many of us us these formulae infrequently and need a method of finding the correct formula for certain problems that arise while constructing a transmitter, receiver or piece of test equipment for the hamshack. Some of the numerous methods of jogging one's memories will be shown and you may use the one that best suits your needs. Of course the best way to remember them is to use them; the more mathematics is studied and applied, the greater its usefulness becomes. Mathematics is a design tool for the radio engineer. Without the use of mathemtaics the ham is like a man with a wooden leg, he is hobbled and his progress in solving radio's numerous problems are slow and discouraging.

Most of us know how to add, subtract, divide and multiply. This is basic knowledge. Applying and improving this basic knowledge gives the radio man a powerful tool. A review of the laws of mathematics learned in high school will be helpful in learning to use mathematics in radio. You do not have to be a wizard to solve the few simple problems that arise in the study of radio.

This is my formula clock. To use it cover the unknown quantity in the inner circle with your thumb and use the known quantities to solve your problem. The formula for most of the problems that arise in the ham shack are shown on the formula wheel on the next page. Most problems involve only power (watts), resistance (ohms), electrical potential (volts) and current (amperes), or a combination of all of these.

Three down and two to go. Ann Lynch (9), KN2SUU/K2SUU, 7504—249th Street, Bellerose, L. I., New York received her two licenses on her ninth birthday (May 15, 1956). The other hams at her house, dad, John, K2GZY and mom, K2OTI use a DX100. Two younger aspirants to go will make the Lynch's an all-ham family.



Other Methods of Remembering Formulae

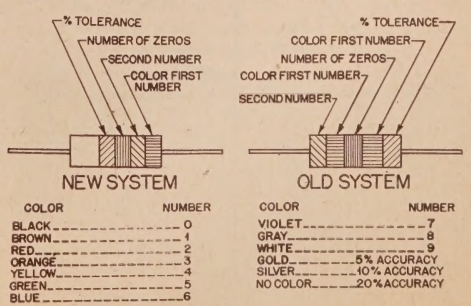
To use this way of finding the formula: place your thumb over the unknown quantity and solve with the known quantities. Remembering the spelling, ERIE, will automatically give you a method of finding Ohm's law for simple mathematical equations.

$$E = RI = E.$$

Ohm's Law

A simple relationship, known as Ohm's law, exists between the voltage, current and resistance in electrical circuits. The student should become thoroughly familiar with all three forms of Ohm's law, since it is very useful in determining the voltage, current, or resistance in an electrical circuit. When any two of these values are known, the third can easily be found.

Ohm's law simply states that the current flowing



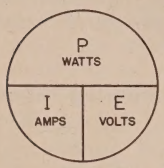
Resistor Color Code

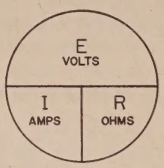
This father-son combo will really knock out the DX, and cover the local also. Ken (18), KN2ONA and his father, KN2RRO will operate 40, 15 and two meters. This station located at 35 Manetto Drive, Plainview, L. I., New York is open for a sked at any time.



in a circuit is equal to the voltage applied to the circuit divided by the resistance.

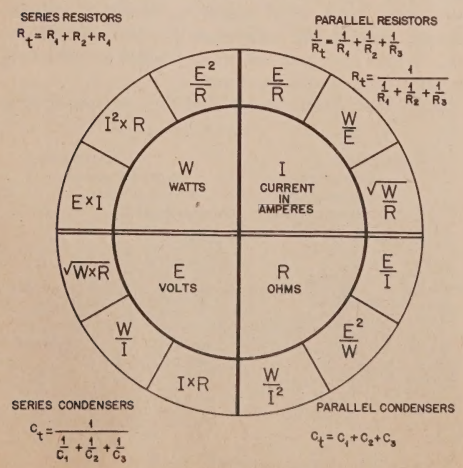
$$I \text{ (amperes)} = \frac{E \text{ (volts)}}{R \text{ (ohms)}}$$





This is the form that is used when the applied voltage in the circuit and the resistance of the circuit are both known, and the value of the current flowing in the circuit is wanted.

Example: What is the current flowing in a circuit if 500 volts are applied to a circuit which has a resistance of 5,000 ohms? Using our formula wheel, place your thumb over the *I* and solve the two known quantities.



$$I = \frac{E}{R} = \frac{500}{5{,}000} = .1 \text{ ampere or } 100 \text{ ma.}$$

If the current and the resistance of a circuit are known, the voltage applied to the circuit can be found by placing the thumb on the *E* on the formula wheel, then: voltage *E* equals the current *I* times the resistance *R*. E = I × R or simply: E = IR.

If the values of the current and the voltage are known, the resistance of the circuit can be found by placing the thumb on the *R* on the formula wheel, then: resistance *R* equals the voltage *E* divided by the current *I*.

$$R = \frac{E \text{ volts.}}{I \text{ amps.}}$$

The power dissipated in a circuit can be found by placing the thumb over the *W* on the formula wheel and solving with the equation of the two known quantities. The amount of power dissipated by a resistor can be calculated by using any of two known quantities, such as resistance, current or voltage drop. A factor of at least two (twice the power dissipation) should be used as a safety measure.

Other Needed Formulae for Radio

Any radio circuit is a combination of parts so arranged that they will control the flow of current in such a manner that certain desired results are produced. These parts are called circuit elements. The three main circuit components used in radio work are resistors, inductors, and capacitors. The ability to use these circuit components to the best advantage is the mark of a good radio man.

A resistor is a circuit element designed to resist, reduce or control the flow of current. Three general types of resistors are made, divided according to their construction. These types are known as fixed resistors, adjustable resistors, and variable resistors.

Fixed resistors are of a fixed ohmic value. The size and construction are determined by the amount of power they must dissipate by their circuit usage. Resistors that must dissipate considerable power are usually of wire wound construction. Small carbon or metallized resistors are made for low-powered requirements. Small fixed resistors are usually color coded to indicate their ohmic value.

Adjustable resistors are used where it is necessary to adjust or change the value of the resistance in a circuit from time to time. The adjustable resistor is usually of wire wound construction, the adjustable element is usually a small metal band that is slid into the right value of resistance and then locked in position. The sliding band can be changed from time to time to make any small changes in voltages when needed.

Variable resistors are used in a circuit when the value of the resistance must be changed often. Variable resistors are of wire wound or carbon construction depending upon the amount of power that must be dissipated. A variable re-

sistor that has a terminal at both ends of the resistance with the sliding element brought to another terminal is called a potentiometer. If the variable resistor has a terminal at only one end of the resistance element and a terminal at the variable element, the resistor is called a rheostat. The volume control in a receiver is usually a potentiometer. Rheostats are used when it is necessary to have an adjustable resistance that is changed often. One common place to use a rheostat is in the cathode circuit of radio equipment.

Formula for resistor calculation

Resistors can be bought with the correct ohmic value or the correct ohmic value can be made by combining available resistors, either in a series or parallel combination, or by a combination of both. The formula for calculation of these combinations can be used in many ways to make use of available resistors. The formula for calculation is as follows.

The total resistance of several resistors connected in series is equal to the sum of the resistances of the individual resistors.

R_t (total) $= r_1 + r_2 + r_3$.

The total resistance of several resistors in parallel will be equal to the sum of the reciprocals of the individual resistors.

$$\frac{1}{R_t} = \frac{1}{r_1} + \frac{1}{r_2} + \frac{1}{r_3}$$

If the several resistors are of equal resistance then the formula is much simpler. The total resistance of several resistors of equal value will equal the value of one resistor divided by the number of resistors.

The total resistor value of a parallel connected branch is always smaller than the smallest resistor value in the branch.

The other formula for resistors is the one used for power dissipation, this formula can be obtained from the formula wheel.

The resistance value of small resistors is usually indicated by the Resistor Color Code. This code is a series of colored markings on the body of the resistor, and should be memorized for future use. The accuracy (tolerance) of the resistor can be determined by the same color coded markings. A color code chart is shown below.

This discussion will be carried on in a future issue.

Letters

New Jersey has representation this month. Joe Kalinowski Jr., K2QYI, 84 Dunbar Avenue, Fords, New Jersey writes:

"Dear Walt:

"This is just a line to let you know what a very fine job you are doing since your inheritance of the *Novice Shack*. You have been a great aid to me and, I know, many other 'hopefuls' of the Novice ticket.

"I had never written you before, because I decided to wait until after I got my 'General,' if I ever did! Well, I did get it, just four days ago, on June 29th. Since then I have been somewhere between 7.0 and 7.1 mc. Boy, that portion of the forty meter band really excels over the Novice section. But that little ½ inch space on the inhaler dial is certainly a good place for learning to copy through heavy QRM.

"I received my KN call early in January, but didn't get going until February when my first QSO was with KN2MEM. Since that time, I have worked 20 states, VE3, and eight U. S. call areas, best DX being K6. In back of this record was the rig which ran only about 15 watts. Receiver was a BC-312, and the antenna was a doublet, about 20 feet off the ground. I now hold a 15 W.P.M. 'CP Award.'

"The present antenna system consists of the doublet, a beer-can vertical for 20 meters (W2OCA, my father supplied the beer cans, not me, hi) and a 137½ foot Windom. Also I have a 300 ohm ribbon folded dipole for two meters. The rig for 2 is a BC-522.

"Well that's my ten bucks worth from here, so 73 Walt. I will sked anyone needing New Jersey for WAS.

"Your Friend, Joe, age 14"

Lester Franklin (14) WN1LDK, 54 Alabama Street, Mattapan 26, Massachusetts writes this little letter.

"Dear Walt:

"I've been reading the *Novice Shack* for about 6 months and I think it's the greatest. I have had my ticket for a week after waiting for about two months.

"The transmitter here is a *Hammarlund* 4-20 which runs about 25 watts. The receiver is an S-38-D soon to be replaced by an NC-300. Antennas are 40 and 80 meter dipoles and a 75 foot wire on the back of the receiver.

"I'm 14 years old and a Freshman in high school. I would like skeds with anybody needing Massachusetts on 15, 40m or 80 meters, for WAS or any reason.

"73, Les"

It has been a long time, but here it is, another letter from Virginia. Rodney Johnson, KN4JFE, 53 Beach Road, Hampton, Virginia sends this letter.

"Dear Walt:

"I haven't seen too many letters from the 'Old Dominion,' so I thought I would drop you a line. The call is KN4JFE and I have had my ticket for about three weeks. In those three weeks I have worked 30 states, VE3, VE5 and VE6.

"The rig is an AT-1 running 25 watts, antenna is a Windom. The receiver is an S-40R, an old make of Hallicrafters. I would like to make a sked with all of the 7's except Oregon, Montana and Idaho. Skeds with the 5's would also be welcome. I operate 40 and 15 meters. 73. Rod.

"P.S. I would also like to make a sked with you."

I just must pass along my thanks to Captain Ross A. Sheldon, K4HKD, Secretary, Fort Benning Electronics Club, Fort Benning, Georgia for sending me the Bulletin, "The Micro Mike" and just to show you that all club bulletins are not dry

Max Holland, KN8AMV/K8AMV, 126 Orange Street, Urbana, Ohio can get to you with his 2E26, 25 watt rig and the S-77-A receiver. Max is building a six meter rig and will be on there with the rest of us soon. Good luck, Max.



statistics here is a paragraph from their bulletin. I thought you would get a kick out of it, I did.

Radio Commercial

K4HKD and W4RCM conducted a little business on the Micro Net the other night. K4HKD had a young tomcat he wanted to find a home for, and W4RCM lived in a bachelor quarters—so, wonder if there are any hams in the YWCA. We know a neighbor with a female kitten. 73. K4HKD.

A double letter comes to *Novice Shack* from Tom Rexin, WN8GAT, 3205 Oak Park Avenue and Bob Check, WN8HBI, 3318 Ralph Avenue, Cleveland 9, Ohio. They write:

"Dear Walt:

"Two of us are writing this letter while we are on vacation in Garrettsville, Ohio. We miss ham radio very much, since there is no rig down here. We enjoy reading the *Novice Shack* very much, since it gives us better understanding between our fellow hams.

"Oh yes, before we forget, we are Tom Rexin—WN8GAT and Bob Check, WN8HBI. By the time you get this letter we will probably be Generals.

"The rig at WN8GAT is a Viking Adventurer into a 40 meter vertical and the receiver is an SX-99. The future rig is a pair of 4E27's. The rig at WN8HBI is a Globe Scout and an SX-100. His future rig will be a pair of 813s. The antenna is a 40 meter vertical.

"Well that's all for now, except we will answer any letters if anyone would like to ragchew through the mails. Good luck, Bob and Tom."

Ron Sefton, W7VWR, West 717—16th Avenue, Spokane 41, Washington writes this letter.

"Dear Walt:

"Congratulations, you did it again. Another top-notch column for *CQ*. Just how long do you think you can keep it up Walt? (As long as *CQ pays* me to stay on the staff, I will always try to give each reader something to enjoy. Thanks for the nice words Ron.)

"I just thought that if I could make the deadline for the August issue, I would ask you to announce a little expedition that W7WJK, myself and another active SWL are planning. About the third week in August, we are going to pack up into the wilds of northern Idaho and will operate low-power on c.w. and possibly fone on 10, 20, 40, 80 and maybe 15 meters. We will probably concentrate on the Novice bands so that a few of the eastern Novices can get Idaho for their WAS.

"73 and Thanks. Ron."

What do you think the kids in the ninth grade with Bob Beatty, KN4IEX of Charlotte, North Carolina would say if they knew that he has the world at his finger-tips and if they could hear the strange (to them) language that comes through the phones at the twirl of the knob of the receiver?



Bob Beatty, KN4IEX, 2025 Radcliffe Avenue, Charlotte 7, North Carolina writes:

"Dear Walt:

"I haven't read the *Novice Shack* very long but I think it is great.

"I am 14 years old and in the ninth grade. I run 65 watts to a Globe Scout 65-A. The Receiver is an S-38-D and the antenna is a doublet. My best DX is California, Texas, and Connecticut. I will sked anyone for any reason, WAS or otherwise.

"In about 3 months of operation I have worked 13 states with 11 confirmed. I operate 80 and 40 meters but hope to get on 15 meters soon. I QSL 100% and enjoy receiving them. Keep up the good work and BCNU.

"73. . . . Bob."

Dennis R. Daluge, KNØEEO, North Street, Springfield, Minnesota writes:

"Dear Walt.

"I sure missed *Novice Shack* last month while you were on vacation.

"I haven't seen many letters from 'The Star Of The North' in *Novice Shack*, why? (Nobody wrote a letter and naturally I couldn't publish one, that is why.)

"I have a Globe Scout 65-A. I used an SW-54 and am getting an NC-98. I have used an 80 meter doublet and an 80 meter end-fed antenna. I also use a 40 meter doublet and have now built a 15 meter beam from the November *CQ*.

"I have worked 22 states with 20 confirmed. My first contact was KN6KPB/KL7. I would like to sked any of the W7s and W6s. I would also like letters from anyone using the $3.96 beam from the November *CQ*. I QSL whenever I can get the QTH. I will be happy to sked anyone needing Minnesota for WAS. I have 3 crystals for each band.

"You are doing a very FB job with the Novice column, Walt, keep up the good work.

"I am 13 years old and will be in the 9th grade this fall. 73. . . . Dennis."

Mike, WN7EDO, 1917 East Avalon Drive, Phoenix, Arizona says:

"Dear Walt:

"I've been reading your column for almost a year now and thought it was about time that I contributed something for it, so here goes.

"I have had my license for about 25 days and have had 70 contacts in 19 states and Hawaii using 50 watts to a *Johnson* Adventurer. My receiver is an SX-99 and the antenna is a 100 foot long wire center fed in an odd sort of a V shape.

"My crystals are 7163, 7195 and 7180. I usually operate on 40 meters but I had one contact on 80 meters. I have listened on 15 meters but so far I haven't heard one station, but I guess it is a good band judging from all of your letters—I probably don't know when to listen.

"I saw your modulator for the Heath AT-1 but haven't seen a modulator for the Adventurer. (Mike, you can use the same modulator for the Adventurer.)

"I think you have the best Novice section I've seen yet—so, keep up the good work.

"73. . . . Mike."

Frank Scaglione, KN2RLG, 111 Stuyvesant Avenue, Jersey City 6, New Jersey writes:

"Dear Walt:

"I sure hope that you keep up you. swell column and interesting articles in *CQ*. As a Novice I appreciate your fine method of informing all of the Novice activity throughout the world.

"I am 17 years old and am still a high school student (now enjoying vacation). I got my ticket February 16th and at present time I am working two meters, though I plan to work 80, 40 and 15 meters very soon.

"My two meters equipment consists of a *Gonset* II into an S-85 for dual conversion. The antenna is a 6 element horizontal beam 120 feet into the air. I have worked 12 states on phone and my furthest DX is 375 miles away.

"Thanks Walt, keep up the wonderful work, we Novices certainly appreciate what you are doing.

"73. Frank.

"P.S. I recently received my Technician ticket, six here I come."

Blake Fishburne, Post Office Box 1609, Sumter, South Carolina writes:

"Dear Walt:

"Here is a letter to let you in on the activities of

KN4EJR. This is my last will as I have just passed my General examination. I sure hope it will arrive soon.

"I have WAS here and have almost worked a Novice in every state. I have worked 4 continents, I need Asia and Africa. I have worked 21 countries.

"The rig is a Viking Adventurer running 50 watts and the receiver is an NC-300. I hope to have a Viking Ranger soon.

"CU SN and 73, Blake."

So, you think you have it hard to get a station together, huh? Read this letter from Lawrence Kayser, VE4LK, 127 Cordova Street, Winnipeg 9, Manitoba.

"Dear Walt:

"I have procrastinated long enough so here comes my letter. I received my call, VE4LK, on January 6th and since that time I have had a few contacts, all local. My real operations will start when I get a receiver of some sort. I favor the 'Novice Q-5er' with possibly some crystal controlled converters ahead of the Q-5er, for the high frequency operation.

"One of the Canadian hams' big drawback is the terrific rate of duty we must pay. About a year ago I bought a *Heathkit* AR-2 receiver and paid $25.50 to *Heath* and then forked over $12.37 more to get it into the country. This doesn't include freight, and this for a high-school kid is too much dough. For amateurs I think these rules (taxes) should be abolished and we should be allowed to bring in equipment free of charge. Well enough about gripes. I hope this gets the ball rolling and maybe we can get some action.

"Your column is terrific and I see a great improvement over the last couple of years. For that matter, the whole magazine has improved greatly and the editorials are great. Another article I look forward to is 'Danny Weil' and his ship 'Yasme,' his experiences are funny and yet serious in one breath. Well this is enough nattering so 73's and keep up the good work.

"Yours Sincerely . . . Lawrence."

Dick Wade, KN4JMI, 325 S.W. 13th Street, Dania, Florida sends this short letter.

"Dear Walt:

"Just writing to say that I have really enjoyed your helpful *Novice Shack* since I started reading it in February. I got my call two weeks ago—KN4JMI.

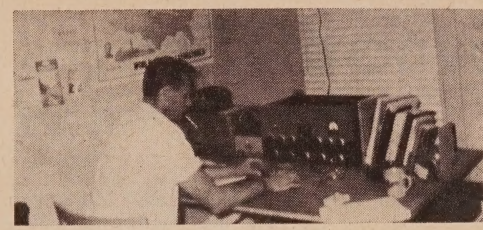
"The rig is an AT-1 and an S-38. The antenna is a 65 foot long wire end fed through a homebrew antenna tuner made by K4GCE. I have had 52 contacts so far in four states and Cuba.

"I would like to see articles on general theory—simplified. As soon as I get a better receiver, I am going on 15 meters and would like to see something on 15 meter antennas. That's all for now, Walt. 73 . . . Dick"

Did you see the simple 15 meter antenna last month, Dick and how do you like this month's article on general theory—simplified? This is the kind of column material that you are asking for, that is why I ask you to write letters telling me what you want. I will do my best to keep this column filled with material that is interesting and at the same time I will try to aid you in getting your General ticket. I try to pick the letters that have a little gem of knowledge or a word of encouragement in them, they give you an idea of what kind of equipment to use and an idea of what you can do with that equipment. A good deal of your success as an operator depends upon your abilities as a good operator and the way in which you use those abilities. A good operator makes use of a little common sense in choosing the time to use a band, the frequency to use and he usually depends upon his equipment to be in first class operating condition. The quality of your signal will determine the amount of returned calls that you receive to your CQs.

Actually, the purpose of this column is to draw the amateurs closer together and make each one of us proud of our heritage as hams. Better operators will improve the status of ham radio, both politically and technically. Knowledge will tend to improve your operating abilities, if put to use. Very few of us put to use all of the knowledge that we have in improving the operative abilities of our stations. Personal habits are also reflected in some of our conversations, and a good many of these could be improved considerably, to our advantage. Petty bickering and airing our grievances on the air can be used by other people to further their cause in discrediting the good that the ham is doing. Set your aims too high to attain and if you fail, you still have improved your standing in the world of ham radio. Very few of us can get to the top of the ladder, but there must be rungs all of the way up the ladder.

Duke Campbell, KN5GDH, 1108 Justin Lane, Austin 5, Texas was born under a ham's Star, his father was HSI in 1911 later 6CMI and now W6ELW. How could he help it? Duke is a city fireman, will sked and will QSL 100%.



Help Wanted

Each month *CQ* lists the names of a number of aspirants who are desirous of a little aid in getting off on the right foot. Can you offer some aid to any of these? Thank you.

Steve Derbyshire (14), Route #1, Knightdale, North Carolina could use help with code and theory.

Gregory Andracke (12), 5940 Chatsworth, Detroit 24, Michigan, Telephone: TUxedo 2-5323 needs help with code.

Alan Dueese, 5—31st Street, Pass-A-Grille-Beach, Florida, Telephone: 21-3324 needs a little help with code and equipment.

Rickey Howe, 622 Douglas Street, Wenatchee, Washington needs help with code and theory.

Dave Coffey, 89 Meriden Street, Buffalo 20, New York, Phone: FA-3034 wants help with code and theory.

James Lytthans (14), 199 East La Verne Avenue, Pomona, California needs help with code and theory.

Donald E. Simonsen (23), P. O. Box 155, Fairplay, Colorado wants help with code and theory and foreign pen pals interested in radio.

Peter Burmeister, R.F.D. #1, Wallkill, New York wants to meet a local ham who will help him also with code and theory.

Bill Dorsett (15), 10705 N.E. 52nd Street, Kirkland, Washington says he would like to join the ranks of the elite, the ham. Can you help him?

John A. Folsom, Waterbury, New York needs help with code and theory. He would like for you to explain a few things to him, O.K.?

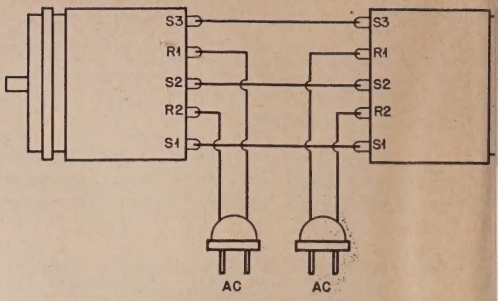
David T. Gruman, 2/Lt. USAF, 2815—41st Street, Lubbock, Texas knows the code but needs advice on constructing a station and getting the license.

Well, that puts the 30 mark on for this month. Be sure and read *Novice Shack* next month for the best column yet and I wish you the best of DX.

73, Walt, W8ZCV

Wayne Green, W2NSD
Editor CQ

Syncros—Selsyns



Typical Selsyn hookup

In looking back through the ham literature I find altogether too little information on how to use Selsyns (Syncros). This may have quite a bit to do with the lack of amateur use of these devices. Quite a few surplus houses are selling them at really low prices these days and there are few ham shacks that couldn't make effective use of them.

Basically the purpose of the Selsyn is to enable you to turn a shaft remotely. The immediate applications would be for remotely tuning your receiver so you could operate it from anywhere in the house or in the yard by means of a small control unit, or remotely tuning a VFO, or even complete remote tuning of your rig. The larger Selsyns can be used for turning beams[1] while even the smallest can be used to indicate the direction of your beam[2]. The Navy used Selsyns to repeat bearings for radar, sonar, compasses, peloruses, etc. They were used with amplifiers to turn turrets, rudders, guns, and other heavy-duty devices.

OK, suppose you want to be able to tune that receiver remotely, what should you buy? How do you use it?

Selsyns are made in different sizes and for different voltages. Check your unit to make sure it is designed for 115 volts at 60 cycles. The size of the unit will depend upon how much work it must do. For tuning receivers, VFO's, etc., a size 5 will be entirely adequate. Beams will probably need a 6 or 7. Indicators can be any size at all since there is very little work involved.

Some confusion may arise over the various types of Selsyns: motors, generators, differentials, and control transformers. For most amateur activities you can essentially forget the last two types. I would suggest you read *Rider* books on Syncros, #180-1 and 180-2 for complete information on these units. For your work you will be interested in the motors and generators. The motor and generator units are almost identical and are interchangeable. A system will work equally well with two motors, two generators, or one of each. The difference between them is merely that the motor unit has a small flywheel built in which prevents it from going into oscillation when the voltage is first turned on. If you are using any sort of mechanical loading on a generator you will have no problems. If you are going to merely use your Selsyn system to turn a pointer or a compass card then you had best use a motor for the indicator. A generator can whip itself apart if started up with nothing connected to the shaft.

Each Selsyn has five wires coming out. Two of these (R1-R2) plug into the 115 a.c. and the other three connect to the second Selsyn. The control wires are numbered S1-S2-S3 to avoid confusion. If you connect S1 to S1, etc., you will find that either unit will follow the other exactly. If you get the wires mixed up you can end up with the two going in opposite directions. You can run all five wires between the two units, or you can just run the three control wires and plug each unit into the nearest a.c. wall socket.

Selsyns are usually marked "F" for motors, "G" for generators, "DG" for differential generators and "CT" for control transformers. When you are buying them it is a good idea to check the ease with which the shaft turns. Don't figure too much on being able to repair faulty units for they are real precision devices and once taken apart are difficult to get back together right.

You can hook several of the motors in parallel if you want and all will turn when one of them is turned. The locking of any one of them will prevent the turning of any of the others. When a differential generator is used you can hook two motors together with the differential and if any one of the three units is locked the other two will turn. Computers often use this system for adding or subtracting two numbers. If the scales involved are linear you get straight addition or subtraction, if you use logarithmic scales (like the slide rule) you get multiplication and division. Build your own computers.

So there is all you really need to know to get started playing with syncros. They are a lot of fun, whether you get them geared up to run your station from anywhere you want to plug in or whether you just hook up a pair of them for the kick of seeing one turn the other from across the room. ■

1. CQ, Feb. '48 2. CQ, Mar. '48

Capt. Sidney S. Rexford, W2TBZ
AFFE/8A Signal Section
APO 301, P.M. S.F. Calif.

Bandspread by the Yard

This whole fool idea was put in my mind by as miserable a collection of well wishing friends as any poor hard working ham ever had. As one funny feller says, "They are the worst kind."

To back track for a little, all them well wishing ham friends came into the shack at one time or another, singly or in mobs, and after twisting the knobs on the "Pride of the Hamshack" they would remark, "Say that bandspread gadget is a honey! You ought to write it up and send it to a magazine. They want articles like that."

Flattery is never wasted on me, I love it. But I am skeptical, aided and abetted by a lazy streak. I distinctly remember getting some fine rejection slips for other brainstorms I went all out on and wrote up and sent off to publishers so they could send them back. This was as late as 1946 too, and the callouses have hardly healed on my index fingers. Why editors aren't interested in articles on de-based 201A's on five meters any more I don't know. There used to be a big market for things like that.

Now I'll try again, since Uncle Sam has provided the transportation to this forsaken, hambandless peninsula known as Korea and there isn't anything better to do than hammer away on this rickety (6th hand) $15.00 portable. Unless you consider visiting the bar at the club better; I do, but I find this cheaper and just as time consuming.

I was going to say that the idea behind this gadget to get bandspread came originally from the old Edison Gramophone with cylindrical records, but the ranks of the hambands are getting full of young squirts who never wound bell wire on a Mother's Oats box, to say nothing of recognizing such common place items of household impediments as Mason Jars, Round Oak stoves or Edison Gramophones, so I won't make any such reference. The book says you should write on the level of the readers; and believe you me that is pretty low. Some of them young fellers don't even know what a TNT circuit is, or even a detector and "One step."

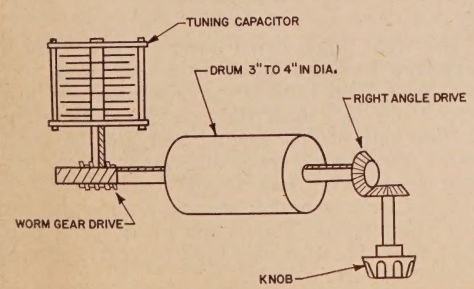


Fig. 1.

Read On

When I started to build the "Pride of the Hamshack" I looked around for a device of some sort that would really give me some bandspread. Bandspread that I could measure in feet not inches, and that could be built out of the junkbox; the pocket book being flat as usual. I would have said "Flatter than usual" but that isn't possible without doing away with the pocket book completely; and if I don't have anything else I got a pocket book. I got it for Christmas in 1932.

I looked over the gears and stuff I have saved from all kinds of junk over the years. While looking I found the breadboard I built my first 47 crystal oscillator on. Ah memories! At first I found a very fine gear train that came from The Great Man knows where. The first idea was to spiral a long scale on a flat disc and have an indicator finger move down the face of the dial as the disc rotated so I could tell what part of the spiral to read. The old SX-16 had an arrangement like that for bandspread. Then I found some old worm drives from defunct surplus bargains that had been too nice to throw away when the stuff was stripped. Like Scratchi, suddenly get stoopendus idea, "Why put the spiral on a flat surface, as the scale on the spiral gets nearer the center of the disc the calibration gets more crowded. Why not put it on a cylinder then the last turn of the cylinder will be just as long as the first turn and the whole thing will be uniform?" Pure Genius, by George! If I'd stayed on the outside, with my brains I could have been President of RCA, or at least chief janitor. Oh well, industry's loss is the Army's gain! Wonder why I'm not a general?

The resulting arrangement has the appearance of a union between a rolling pin and a Faximili machine, but it works and very well.

The Receiver

The "Pride of the Hamshack" is a single-double superhet. That is, it is a single super-het on 80 meters and the rear end for crystal controlled converters on the other bands. Basically it covers 3000 kc to 4000 kc, and is calibrated every kc from 0 to 1000. This way it reads frequency directly without changing scales regardless of what band is in use. Ten meters will be covered in two steps if I ever get that converter finished for it. Incidentally these converters plug into a drawer in the front panel like the coils in an HRO receiver. Other interesting features include built in side-band slicer and "Q" multiplier, but that isn't what this is all about. This is about bandspread—yards of it!

About one sixth of an inch is a kc on the scale, and the whole 1000 kc is spread over more than 14 feet. Most anybody is willing to concede that this is pretty good as far as bandspread is concerned.

There was once an old Chinese Gentleman who said "A picture is worth a thousand

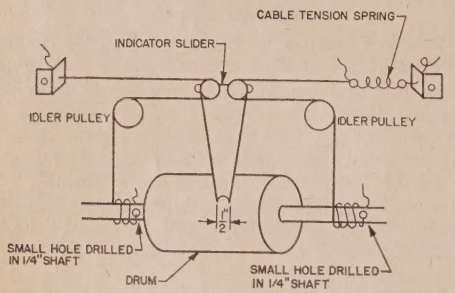


Fig. 2.

words." I agree with the old boy, not for his philosophy, but because it gives me a chance to display my fine artistic talent which has never been full appreciated either. I take my #2 Eberhard in hand and draw *fig. 1*.

The worm gear and drive gear to the capacitor, both shown on the left, are the heart and soul of the whole gadget. The secret of success of failure lies right here. This assembly *must be completely free of backlash* of any kind. Any time the worm gear turns and the capacitor does not, Brother, that is backlash! This unpleasant situation can be caused by several things. I won't go into the causes, only the cures.

The capacitor should be a good quality affair with bearings on both ends of the shaft. It should turn easily with no tendency to stick or bind during rotation. In fact the easier it turns the better, as long as there is no end play of the rotor.

The drive gear for the tuning capacitor must be one of those double gear jobs with tension springs to insure absolute movement. Most of these worm gear assemblies used in surplus equipment are this type and are mounted in a sturdy frame thereby insuring proper alignment. A very satisfactory worm drive is to be found in the Oscillator section of the TU units for the BC-191 and BC-375 transmitters. The whole TU unit has been on sale in local surplus emporiums for years for a couple of bucks or less.

Couplings

A flexible coupling between the drive and the tuning capacitor will eliminate any binding that might take place at this point. While not shown, it is recommended that flexible couplings also be employed at either end of the drum, this will greatly simplify aligning the whole setup later.

The drum can be made of almost anything with the proper dimensions. I wouldn't recommend diameters of over 4", with 3" being just about right. I used a piece of bakelite tubing 3" in diameter that was laying around the shack. A tall tomato juice can would have probably done the job just as well. I do recommend removing the juice first, and maybe rinsing a little. I capped the ends of the tubing with some home made discs of sheet aluminum and fitted them with set screws for ¼" shafts by cannibalizing from an old flexible coupler. The only real trick of the drum is to get it centered on the shaft so that it doesn't wobble like the wheels on the clown's jitney at the circus.

The length of the drum comes into play here. Now you don't just take any old length for it that happens to fit your fancy—No Sir! You have to go about this thing in a scientific manner, otherwise you may find you have more scale than you have drum to wind it on or else you got more drum than you need and it is taking up space that would come in handy for something else.

Here is the way to do it: Count the number of revolutions of the worm gear needed to cause a 180 degree rotation of the tuning capacitor. Make like a mathematician and call that number X. Insert X in the following formula and there you are with about ¾" margins left on both ends of the drum after the calibration scale has been put on.

$$\text{Length of Drum in Inches} = \frac{3 \text{ plus } X}{2}$$

The right angle drive doesn't require much comment. In fact I intend to use the same sort of gadget on an ECO in the future and will just extend the ¼" shaft through the drum right out the side of the cabinet and put the knob there. It will save some additional space. My right angle drive has a little backlash but it does not seem to bother me and no one else has ever complained. This is the place for it if it must exist. Most of this type of gear arrangements will have a little.

The subject of brackets is an important one.

I don't have any super-duper jobs made of reenforced boiler plate, in fact I cut them all out of as heavy gage aluminum as my tinsnips would handle with Ole Ish as motive power. *All brackets must be sturdy affairs,* however, or the effects of backlash will appear with all of its associated ills. These brackets should not be of the little two hole "L" variety, but planned to attach to as many points and over as wide an area as possible on the components and chassis and/or panel. The tuning capacitor must also be securely anchored in place.

The chassis of the "Pride of the Hamshack" was made of standard aluminum chassis stock and consequently left something to be desired in sturdiness, but the addition of several shielding bulkheads and braces to the panel stiffened it up so there was "No Sweat" on that score. I would recommend as heavy a chassis be used as available to anybody who would like to try one of these beasties.

A good application of vaseline on all of the working parts and surfaces should make a smooth working mechanism.

The indicator portion of the apparatus is a little involved but no more so than the average slide rule dial of a BC set. The remarkably clear artistry displayed in *Figure 2* tells all about it. Almost anybody can understand I betcha.

There must be about ¾" of shafting left available at each end of the drum to operate this indicator. Notice that as the cable winds up on one ¼" shaft it unwinds from the other. The tension on the cable is adjusted to the minimum necessary to give smooth action to the indicator slider. This tension is quite small when all of the parts of the indicator work smoothly. With low tension the cable will probably last for years. I used nylon fish line for the cable and after six months there is no sign of wear.

The slider is designed to be pulled along a track or guide that is not shown on the drawing. I made my track out of an old curtain rod. Some of my ancesters were "Lace Curtain Irish" and passed them down through the generations. Any of the popular slider arrangements used on commercial slide rule dials should be satisfactory.

The drum will be viewed through a slot or window in the panel. Cutting this hole is probably the most exasperating job of the whole affair. *Allway* puts out a rigid hacksaw with replaceable blades which doesn't make the job a breeze but at least cuts it down from hurricane proportions to a near gale. About that hole for the window, before cutting away like mad take a look at *Figure 3.* Notice that the center of the hole isn't the same as the center of the drum. This is caused by a condition known as paralax. See there is that old noggin working again!!

It all boils down to the fact that the center of the window must be about ¾" higher than the center of the drum for a 3" diameter drum, or about 1" higher for a 4" drum.

A ¼" thick piece of plexiglass about ½" bigger all around than the size of the hole for the window can be bolted in front of the window and makes a commercial looking finish. A little careful planning will permit the same screws to be used to support brackets, the indicator slider track, and a couple of pilot bulbs for illumination. Two such bulbs mounted over the drum and next to the panel give all the illumination needed.

The little idler pulleys used in the indicator assembly were "Slickyed" (A Korean term for outright theft) from the Jr. Ops outgrown *Erector Set.* Smaller pulleys such as those used in the little AC-DC slide rule dials would have been more preferable because of their smaller size.

Now for the process of putting on the calibration. This requires either the patience of a saint, the vocabulary of a mule skinner or a combination of both. Of course this must be done with the plexiglass window removed. I wound a good quality piece of white bond paper around the drum and carefully cut it to size. I held this piece of paper in place on the drum

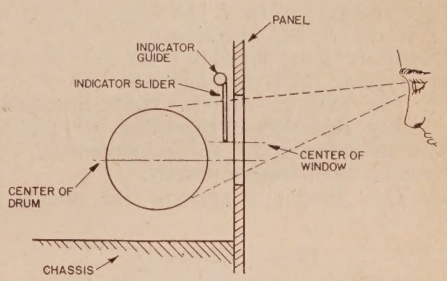


Fig. 3.

with rubber bands. (Which I put on the drum before assembling.) After running through the complete tuning range to be sure the spiral would be centered on the drum, and that there would be the necessary ¾" margin at both ends, I held a pencil lightly in the notch of the indicator and slowly turned the dial over the entire range. The paper is then removed and the pale wiggly line inked in with a ruling pen and straight edge. (Yep, I said straight-edge—try it and see.) After inking, the paper can be carefully cemented in place and the slider readjusted slightly to permit the two points of the indicator to straddle two lines.

The final calibration will be put on after the electrical circuits are aligned and debugged. Numbered points should appear every five kc, with marks but no numbers at the one kc points.

A line scribed down the center of the plexiglass window horizontally will serve quite adequately as a hair line.

I'm about as conceited as the next guy, may-

[*Continued on page 126*]

Mobile Whips Are Directional

Arthur E. Judd, K5CFW (ex-W2VMF)
P. O. Box 023
Cloudcroft, N. M.

You can't work 'em if you can't hear 'em, and you can't hear 'em with the beam in the wrong direction. Don't fall out of your Thunderbirds, mobile hams, but this applies to you, too. For the average mobile installation can work like a beam if one just knows how to turn it.

Most of us who work mobile have had the experience of turning the car while in motion and having the station worked grow much weaker or much stronger in our receiver. This happened to me so often my curiosity overcame me, so I undertook a study and review of the situation to learn just how and why my mobile rig worked directionally.

Here are some findings from 3½ years of tests, reading, study and figuring:

1. The average mobile radio installation is highly directional, regardless of theories about omnidirectional vertical antennas. This is true on most amateur bands.

2. This directivity appears due mainly to an increase in field strength in the air above a metal car body and a decrease in radiated signal intensity at the sides of the car when the antenna is bumper or shoulder-mounted at the rear of the vehicle.

3. The directional effect increases as the car moves in line toward the signal source. This appears due to eddy currents in the car body.

4. Signals sent and received are weakest when the car body is at right angles to the station being worked.

5. While mobile directional characteristics are altered somewhat by such things as surrounding objects and ionospheric variations, the main directive characteristics of the installation will not vary too much under most operating conditions.

I went into this study to learn how to get the most out of my mobile antenna. I hope this article will help you likewise to make the best possible use of yours.

When a vertical antenna is mounted on an automobile, some significant changes take place from the theoretical condition of an omnidirectional quarter-wave vertical antenna over a perfectly conducting ground or an infinite copper sheet. We all know about the effects of such things as antenna loading changes due to whip sway while in motion, trees, buildings, wires and changing ground conditions. But the greatest effect on field intensity usually does not result from any of these causes. It results from the car's metal body.

Field-strength measurements of others have indicated that, *Fig. 1,* in the area above an all-metal car the field strength increases 10 to 30 per cent over that at the antenna, while at the sides of the car there is a decrease in intensity of some 40 per cent. The pattern of variation in strength seems generally independent of frequency.

This distortion of the r-f field can be attributed to induced currents or secondary fields caused by the metallic surfaces of the car.



During QSO's

After observations of the author and other mobile hams confirmed this phenomenon, I decided to measure the directive pattern of mobile antennas on favored amateur bands.

A field pattern is three-dimensional, so it

was out of the question—without a balloon—to make measurements in all directions. I debated whether to take measurements at a far distance or in a near field (Fraunhofer pattern or Fresnel pattern). The latter won out.

Early one morning—I was W2VMF then—I got W2VLR to bring along his 10-meter mobile rig and accompany me as I drove to a nearby smooth and open area, clear of trees and other obstructions for at least 15 wavelengths on 20 meters. My 20-meter rig was installed then in a 1947 Dodge club coupe, and the antenna was center-loaded with a capacity hat.

Incidentally, in figuring out the behavior of an antenna with a capacity hat, it's permissible to forget the negligible radiated field produced by horizontal currents flowing in the hat.

We operated my rig on the way out, and it was thoroughly warmed up. We parked my car in the middle of the open area, turned on the

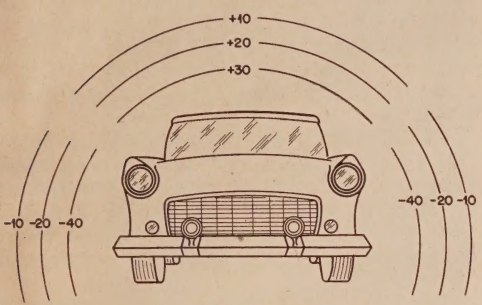


Fig. 1

carrier and took off with a surveyor's tape, a compass and a Model 200 field-strength meter (*Measurements Corporation,* Boonton, N. J.). Thus we plotted the relative strength of the signal from my rig at a distance from the car.

Plots were taken throughout the band, with results as shown by *Fig. 2*. As you can see, radiated strength was greatest in a direction 10° to 20° to the right of that in which the car was headed.

To discount the effect of terrain peculiarities or unknown conditions, the car was turned 90 degrees and other plots made. Results were similar.

Tests were made with the car's broadcast receiving antenna, on its left front, fully extended and then fully collapsed. Directivity on 20 meters was greater with the broadcast antenna collapsed.

Next we made plots of W2VLR's 10-meter mobile signal. Results were even more astonishing than with my 20-meter rig. As shown in *Fig. 3*, we found a highly directional major lobe, again to the right of the car's front center. But on 10 meters, directivity was most pronounced with the car's broadcast receiving antenna fully extended. Apparently it acted as a director.

Later tests were made on 10, 15, 20, 40 and 75 meters. There were similar directive patterns on all bands, but the most astonishing results appeared on 10, 15 and 20.

These findings have been confirmed in actual operation over long paths. One morning I established contact on 20 meters with CN8FL. He watched his S-meter while I reoriented my car, and an S-7 was turned into a 5-db-over-9 report at his location.

Later I contacted HH3DL while driving on a compass heading approximately 45° northeast near Buffalo, N. Y. My major lobe projected at about 65°. HH3DL's QTH is on a magnetic heading of approximtaely 140° from Buffalo. I drove my car into an open area and, with the aid of a compass mounted in easy view, I aimed the car at a heading of approximately 120° to center my major lobe on Haiti.

HH3DL reported a rise of about 20 db in my signal strength!

Other on-the-air checks were made with CN8FR, OX3BI, K6FAL, W5WRN, W4PGZ, VE1MQ, VE6WH, W7LWC/VO4 and many other mobile and fixed stations. It became quite evident that it paid to utilize the strong lobe to the right front of the car.

While living in Buffalo and driving to work

[*Continued on page 106*]

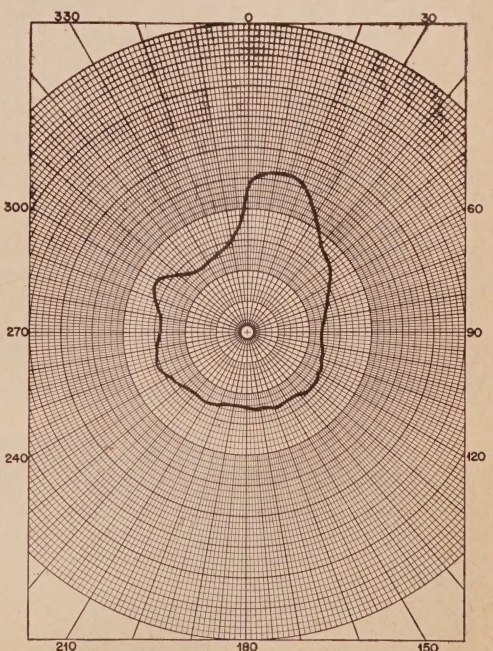


Fig. 2

W4KFC Trip to Europe

(Feb. 15-March 4)

Victor C. Clark, W4KFC
P. O. Box 73,
Annandale, Va.

When it became apparent that a trip to Europe loomed as a possibility in connection with my work, contact was made on 14 mc with DL7AA in Berlin, the first point on my itinerary. Rudi gave me his telephone number and said "Be sure to hold Friday evening open for the regular meeting of the Berlin DX Club!"

When I reached Berlin, a telephone QSO was soon effected with Rudi at Station RIAS, where he works. Rudi put me in touch with Bob Jacobsen, DL4QR, who was our host at a pleasant pre-meeting dinner attended also by DL7AX and Marv Amundson, a co-worker of mine. A brief but enjoyable visit to DL7AX's FB station followed, and from there we proceeded to the home of DL4QR in the Zehlendorf section of Berlin, where the meeting was held.

The club meeting was attended by DL7's AA, AB, AD, AX, BA, CW, DZ, EN, FW and, of course, host DL4QR and his charming XYL. DL7BA emerged from bed, where he had been recovering from a leg injury, to attend the meeting. The business meeting was conducted in German, but the boys all switched to "G" for the benefit of the visitors and from that point on I might easily have imagined that I was attending a club meeting back home. Topics discussed ran the gamut from TVI prevention to how to work Carroll, Stafford and Sullivan counties for the Worked All New Hampshire award (which DL7AB is pursuing!).

Most of the equipment used by the DL7 gang is home-constructed, there being very little commercial equipment available at reasonable prices. DL7AX, for example, had a high-power modulation transformer under construction at the time of our visit. Only a limited amount of military surplus equipment has been available in Berlin, dictating the need for home-built receivers and even such items as transmitting tuning condensers. TVI has taken its toll in Berlin, where TV signals are of relatively low field strength. But as in the case of U. S. amateurs, the indefatigables are finding ways and means of correcting their TVI difficulties and the problem appears to be a diminishing one.

The D.A.R.C. has its own official organ, "DL-QTC," the Dec. 1955 copy of which contains some 60 pages of text and illustrations, including a VHF and DX section. D.A.R.C. sponsors the W.A.E. DX contest and award both of which receive complete coverage in "DL-QTC."

There are about 3500 licensed amateurs in DL now and some concern is felt for the fact that only a relatively small number of youngsters are breaking into the game. One factor here is the high cost and scarcity of equipment as well as technical publications. DL4QR informed us that there is only one complete set of *CQ* and *QST* in Berlin and said that he would be glad to distribute any back issues of *CQ* or *QST*, handbooks, callbooks which the "W" gang might care to forward to him. His mail QTH is: Erling R. Jacobsen, DL4QR, 7350th ABS, APO 742, U. S. Army, New York City, N. Y.

The meeting broke up at about 2:30 a.m. (one of the DL7's had to be at work at 5:00 a.m.!) whereupon "good-bye's" were said and



eb. 17 meeting of the Berlin DX Club. Left to right: DL7DZ, DL7AD (ex-OK2RM), DL7AX, W4KFC, DL7EN, DL7AA, DL7BA, DL7AB, DL4QR, DL7CW, DL7FW. DX hound at lower left belongs to DL4QR.

DL4QR drove us back some ten or twelve miles on snow-packed streets to our hotel on the opposite side of town. DL7 QSO's from home will never again be regarded quite so matter-of-factly!

The Berlin visit also afforded two opportunities to operate DL4QZ, at Templehof Airfield. Operator Ron Moore very kindly made the station available to us, and QSO's were made on 14 mc c.w. with W1DC and W3EPV, who confirmed that all was well at home, and with two or three other W's. YA1AM was heard at S8, working west coast W's on one occasion!

A brief visit to Vatican City and stopover in Istanbul (European Turkey is a rare item for the W.A.E. award) caused me to speculatively raise a few hypothetical dipoles. Lacking time, equipment and authorization in each case, however, I could only choke back a sob and move on.

The next ham visit was to the home of WØPZ, stationed in Ankara, Turkey. Ham



W4KFC/HV. Look, Ma, no rig.

radio, we found, is not permitted in Turkey, except for two or three U. S. Military affiliated stations in Izmir on the west coast. It seemed strange to be in a city of a quarter of a million persons without a single ham station or TV aerial! It is unfortunate that no way has been found to permit amateur radio operation in TA-land for it is obviously depriving that country of an excellent means for developing badly-needed technical personnel.

The first weekend of the A.R.R.L. DX contest found me a long way from the key at W4KFC. On that Saturday afternoon I flew from Ankara, via ZC4 to Beirut, Lebanon,



14 mc. folded dipole atop 8-floor apartment building, looking toward W-land.

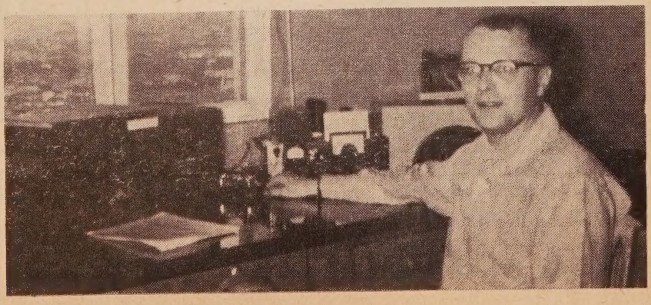
where I spent the next two days with George Luecker, OD5BS. The W's were beginning to sift through the potent European signals on 14 mc at around nine p.m. when we had our first chance to "check the band." W3MSK was the first one heard, but we weren't able to attract his attention with the fifty-watter at OD5BS. In the next three hours some 25 or 30 "W" QSO's resulted, including one with W3VAN, who obligingly sacrificed a few minutes of his contest time to inform the XYL in Annandale of my whereabouts.

It was a surprise to hear the W6's and W7's coming through right along with the east coasters. The "OD-W" path seemed to come and go; at times there would be two or three QSO's in a row, then 15 or 20 minutes of fruitless calling and few W's coming through. Almost every "CQ USA" resulted in a reply from one or more European stations and once, to my amazement, we were called by AC5PN.

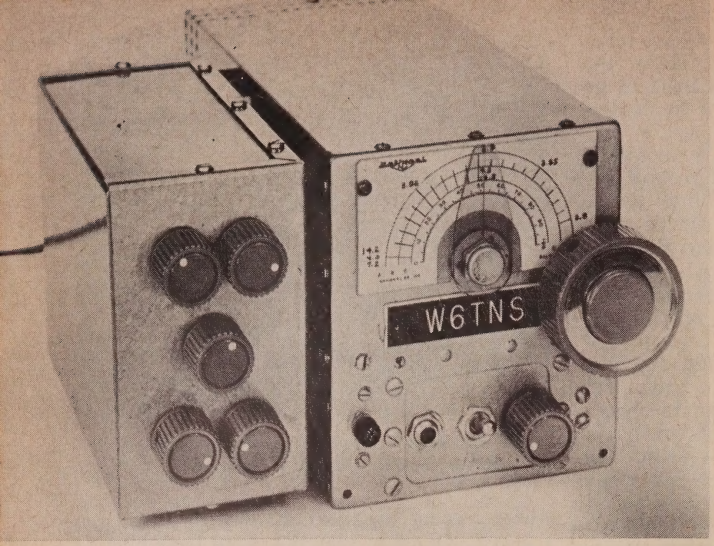
The strongest "W" heard at OD5BS? Yes, you guessed it . . . W4FU . . . closely followed by W2JT, W3MSK, K4GEZ and W4KXV. Listening was restricted to a period of about three hours the first night and 30 minutes the second, so many active "W's" obviously were not encountered. KV4AA and TI2PZ were also very strong.

OD5BS is located on the seventh floor of a modern eight-story apartment building on a 300-foot hill overlooking Beirut, the mountains and the Mediterranean. Although his present equipment comprises a pair of 6L6's, a folded

[*Continued on page 118*]



OD5BS, Beirut.



The Single Sideband Q5'er. Under that shining exterior is, believe it or not, a BC-453 Command receiver. The upper left knob is the null-off-peak switch for the Q Multiplier. The upper right knob tunes the variable capacitor, C1-C2. Selectivity is controlled by the center knob and the Q Multiplier frequency is changed with the lower left knob. Band changing is accomplished with the lower right knob.

Donald L. Stoner, W6TNS
Engineering Consultant
Box 137, Ontario, Calif.

Surplus Conversions

The Single Sideband Q5'er

War surplus equipment is many things to many people. To the Novice, it is a god-send. One can assemble a complete station, composed entirely of war surplus equipment at very low cost. However, there are pitfalls to be avoided, such as equipment that cannot be converted to anything except parts, or receivers and transmitters that are difficult to convert to amateur bands. One such unit is the APX-1 and 2. Just off hand, I can't think of anything that this unit could be converted to, except possibly a 110 volt IFF interogator (it was 28 volts) and who needs one? However, looking at it from the other standpoint, there must be $50.00 worth of parts in that gizmo. There are at least 2 dozen good ceramic sockets, maybe 100 ceramic capacitors (all popular values), not to mention motors, coils, plugs, thigamo-bobs, franastats and last but not least, left hand Romit rods. I digress.

For the Technician, surplus equipment is a means of getting on the high frequency bands, with units that would be unobtainable, at any price, on the commercial market. As a Technician, my first 420 megacycle rig was a moldy old APS-13 that looked like it had been used to keep the mud from shifting on the bottom of some harbor. The dirt was at least a quarter inch thick but it was fun cleaning it up, installing a 110 volt power supply in it and using it on the 420 band. I'll never forget the thrill I got from working a station in Los Angeles, from San Diego, 110 miles away. Even though it was a modulated oscillator and the modulation was "raunchy," the APS-13 rig provided many fine contacts and at a total cost of less than $10.00.

The old timer can fill out his station with surplus gear. There is a definite increase in the number of hams getting on 2 meters for good old rag chews. 80 and 40 meters have become so crowded that it is difficult to get a solid QSO. 2 meters provides the old timer with a band that is, for the most part, QRM free, static free, and free of QSB. Nine out of ten hams on the two meter band do not even use a v.f.o. All they need are two or three crystals and QRM ceases to be a problem.

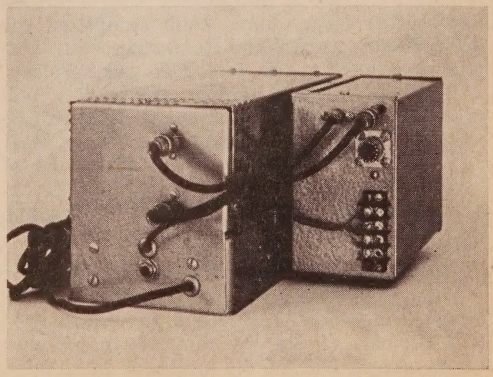
To the manufacturer of commercial equipment, war surplus is a dirty word (or at any rate, it used to be). Back in the early days of war surplus, there was so much quantity and the price was so low, that it was pretty tough to sell any piece of commercial equipment. Many manufacturers went on the rocks because they could not compete with war surplus prices. Looking back through some old copies of *CQ*, I find selsyn indicators for $5.00 a pair, a 6 foot enclosed relay rack (brand new) for $18.50, BC-221 frequency meters for $39.00,

PE-103 dynamotors (also new) for $5.00 (Gad!), the complete SCR-274/N units including 3 Command receivers, 2 Command transmitters, 4 dynamotors, racks, cables, control boxes and spare tubes for $30.00. It is pretty easy to see why the ham gear manufacturers did not do much business with these odds. All this has changed, of course, and the surplus store of today has only a fraction of the gear of "the good ole days." And today, manufacturers of amateur gear are turning out equipment at an unprecedented rate.

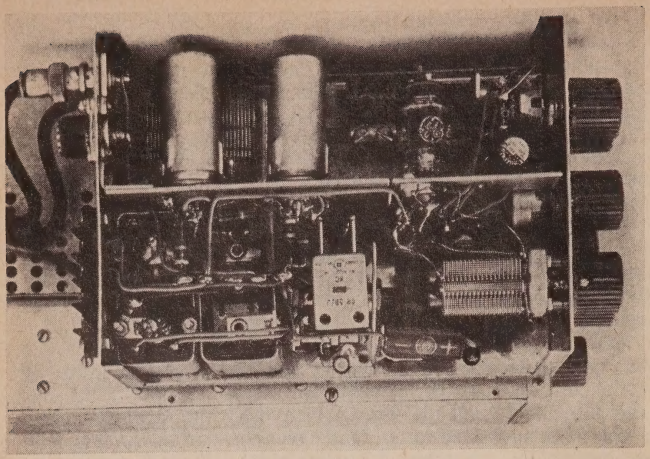
Some of the newer hams probably do not remember some of these early bargains. Actually, right after the war, electronic surplus was even cheaper than these previous examples. The first "goodies" to appear on the surplus market went just like hot cakes and the dealers did not need to advertise. For this reason, some of the better bargains were never recorded for posterity in the pages of *CQ*. If I may reminisce for a moment, I can still remember a cold winter day in early 1946. I was still in high school then, and for weeks I had dreamed of my safari to the surplus stores in Detroit. Finally, that morning arrived and at the crack of dawn, several hams and I headed for that fair city. I believe, at the time, I was shopping for Command receivers and one of the big surplus emporiums was having a special on them. With a fluttering heart and eyes as big as 3 cm radar reflectors, my friends and I bolted down the rows of plexiglas B-17 bubbles and the Mark II cotton pickers (brand new) and headed for the electronics section. One could spot the gear a half mile away. It was shining like a sea of black crackle, ship grey and olive drab. Upon inquiring about Command receivers, the salesman showed me a 3 to 6 megacycle and a 6 to 9.1 megacycle demonstrator that was just like the ones in the overseas shipping boxes. I believe the dialogue went something like this: Placing my eyeball to his eyeball, I shrewdly asked "How much for the two of 'em?" (This was the fashionable way to dicker in those days.) After sizing me up for a hot one, the salesman says, "Two Ninety Eight" and with a flourish, waves toward the sparkling brand new receivers. "What," I bellowed, "you raised your price! The ad says a Dollar Ninety Eight!" "So we got overhead" shoots back the salesman. (It was a big circus tent, if my memory doesn't fail me.) "Tell you what I'm gonna do" (a popular expression back then), "I'll throw in one of these 190 to 550 kilocycle jobs (brand new of course), nobody wants the darn things." (I knew that I could have gotten a better deal at another store on the other side of town, but it was starting to snow and the streets of Detroit can get pretty slippery, almost as slippery as that salesman. I had better quit reminiscing, the manuscript is getting tear stained.) However, if you think I could be spreading the facts a little thin, look through some of the old copies of CQ. Boy! What deals—those were the good ole days!

In presenting surplus conversions I have several ulterior motives (besides money). It seems to me, and quite a few others, the experimenting phase of amateur radio is a lost art. The current "do it yourself" trend certainly is not getting its message across to the amateurs. Too many amateurs would rather put the green on the line and bring home a factory made ham station, never more to get burnt by a hot soldering iron. Some hams have never seen the insides of those mysterious boxes upon which are mounted the switches they flip and the knobs they turn. To me, it makes about as much sense as a sailor spinning the little green propeller on the end of a torpedo. Don't get me wrong, I have nothing against commercial equipment. Over the past few years I have purchased several pieces of ready made equipment, but like liquor, cigarettes, women and DX contests, excesses should be avoided. The satisfaction that you receive when you "roll your own" cannot be measured. Invariably, when a ham constructs something, it does not work right off the bat, and the person has to think a little before the trouble resolves itself. Back to the soldering iron, men!

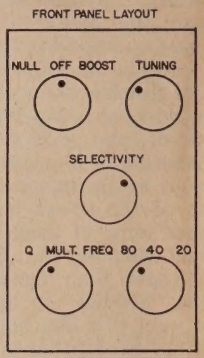
All too many of the conversions that I have seen are simply an attempt to get the units working with a minimum of effort. Painted over panels, dangling power supplies and outrigger tubes prevail. The old axiom "a job worth doing is worth doing well" certainly applies in this case. If one spends ten or twenty hours converting a piece of war surplus, why not spend a couple more hours sprucing it up? With a very little work it is possible to do a nice job of de-militarizing surplus gear. A little paint to cover the battleship grey or olive drab and the unit begins to take on a commercial appearance. Take a hint from the manufacturers. Some chrome here and a few shiny knobs there, and it will take a seasoned "surpluser" to detect any resemblance to military equipment. One of the best articles on the



Rear view of the SSB-Q-5er



Side view of the Single Sideband Q5'er converter. If you don't have a "parts press," better build it on large chassis.



subject was written by Charles Welch, W5MHK, in the October 1950 issue of *CQ*. The name of the article is "Suggestions on How to Dress up Your Station" and it is recommended reading. At the risk of sounding like a politician proclaiming his platform, I would like to promise something in the way of war surplus conversions that are a little out of the ordinary. The constructor can add the finishing touches or omit them as he desires, but they will be included for those who desire the "factory look."

This conversion is an example of the "spit and polish" technique. Believe it or not, but this is the same receiver that was used in the Novice Q5'er article in the January '56 issue of *CQ*. Not more than a total of 3 hours was spent shining up the old BC-453, but what a difference in the external appearance! A full cover and back plate were constructed out of *Reynolds* "do it yourself" aluminum to replace the original one that was badly dented. Then a liberal coat of glossy grey paint was applied to the whole shebang. In addition, the circular dial was discarded and replaced with a spare scale from a commercial dial assembly. A plastic dial cover and pointer with a scribed line, and a large, shiny knob completed the de-surplusing treatment. Remember, war surplus does not have to look like war surplus!

Because a great number of readers will probably be new amateurs, every effort will be made to keep the conversion instructions clear and concise. Future conversions should be of particular interest to the Novice and Technician, and for the most part will feature step by step instructions from start to finish.

Additional Notes on The Novice Q5'er

After my wrists healed (where I slashed them) I answered 121 letters from interested constructors. (I am referring to the Novice Q5'er error.) One of the questions most often asked (in addition to "Why doesn't it work?) was "How can I add 10, 15 and 20 meter coils?" To provide these readers with a satisfactory answer, several coils were tried in the Novice Q5'er circuit. The results were very unsatisfactory, to say the least. On the 15 meter band the images of commercial stations were all over the place. On ten meters, amateurs operating in the high end of the band appeared on the low end and vice versa, ruining the excellent calibration of the Novice Q5'er. In short, because the oscillator was so close to the incoming signal frequency, images made the Q5'er unusable on these bands. Further experimentation led us around to Bill Scherer's (W2AEF) "Converter-ettes" as described on page 42 of the *CQ* "Mobile Handbook." Several of these converters were constructed and connected to the Novice Q5'er. The converters were adjusted (as described by W2AEF) to produce an i.f. of 7 megacycles and the Novice Q5'er was tuned to this frequency. The results were amazing! The stations rolled in from all over the place, and there was not an image to be found. The constructor might look down his nose at a high frequency converter that was not crystal controlled because a tunable converter might destroy the high stability characteristics of the Novice Q5'er. This is definitely not the case, after a few minutes of warm-up, the Converter-ette shows no signs of thermal instability. By closely following Bill Scherer's layout and construction, the mechanical stability is excellent. *Fig. 1* shows a coil chart for adapting the W2AEF "Converter-ettes" to the Novice Q5'er or the Single Sideband Q5'er.

Tuning twenty meters on the Novice Q5'er was a different story. By using high "Q" coils in the antenna and r-f amplifier circuit the images were down about 35 db from the incoming station. Not the last word in image rejection, but quite satisfactory for general operation on 20 meters. Because of the simplicity of adding 20 meters to the Novice

Q5'er, it was included in the Single Sideband Q5'er. In this receiver, best image rejection is obtained by selecting a crystal that puts the desired section of the 20 meter band at the 550 kc end of the Q5'er dial. Down at the 190 end of the dial, the image rejection is in the order of 10 db and is quite unsatisfactory.

Another request from readers of the Novice Q5'er article was (believe it or not) "How can I obtain more selectivity for SSB operation?" There have been many tricks for improving the selectivity of the BC-453 such as sawing off part of the coils to obtain greater separation, decoupling the coils from the tubes and so on. A little more experimentation on the Novice Q5'er produced a good working Q Multiplier at 85 kilocycles. Although there is no literature on using the Q Multiplier on frequencies other than 455 kc, it would appear entirely feasible and desirable. By substituting the Ferri-Loopstick with a Miller television width coil and juggling the values of the shunting capacitors the Q Multiplier seems to work just as well on 85 kc as on 455 kc. The measured selectivity of the SSB Q5'er with the Q Multiplier at minimum bandwidth is 85 cycles (yes, I said cycles). I make that statement with a great deal of reservation but I have the curve to prove it. The bandpass was checked with an LM frequency meter (with both hands on the dial). Even with the Q Multiplier full on, the drift in the BC-453 is not noticeable. This desirable feature can also be added to existing Novice Q5'er receivers with the same excellent results. It is really a sensation to copy c.w. with this kind of selectivity. Drift in crystal controlled Novice transmitters is easily detected and a chirping signal is impossible to copy. Single side-band stations are easily tuned in by backing off the selectivity to about 1600 cycles. Switching on the Q Multiplier sucks the sideband station right up out of the heterodynes caused by the old fashioned transmitters with the carriers. The 12AX7 portion of *Fig. 2* is the 85 kc Q Multiplier and this part of the circuit could be removed bodily and added to existing Q5'ers. Because of the high inductance involved in the 85 kc tuned circuit, it may be necessary to change the values of *C11* and *C12*, one way or the other. The adjustment of the Q Multiplier has been well covered by Champlin (*CQ*, Oct. '53) and Bill Scherer (*CQ*, Jan. Mar. Apr. '55) and the constructor should have no trouble obtaining the additional selectivity if their directions are followed to the letter.

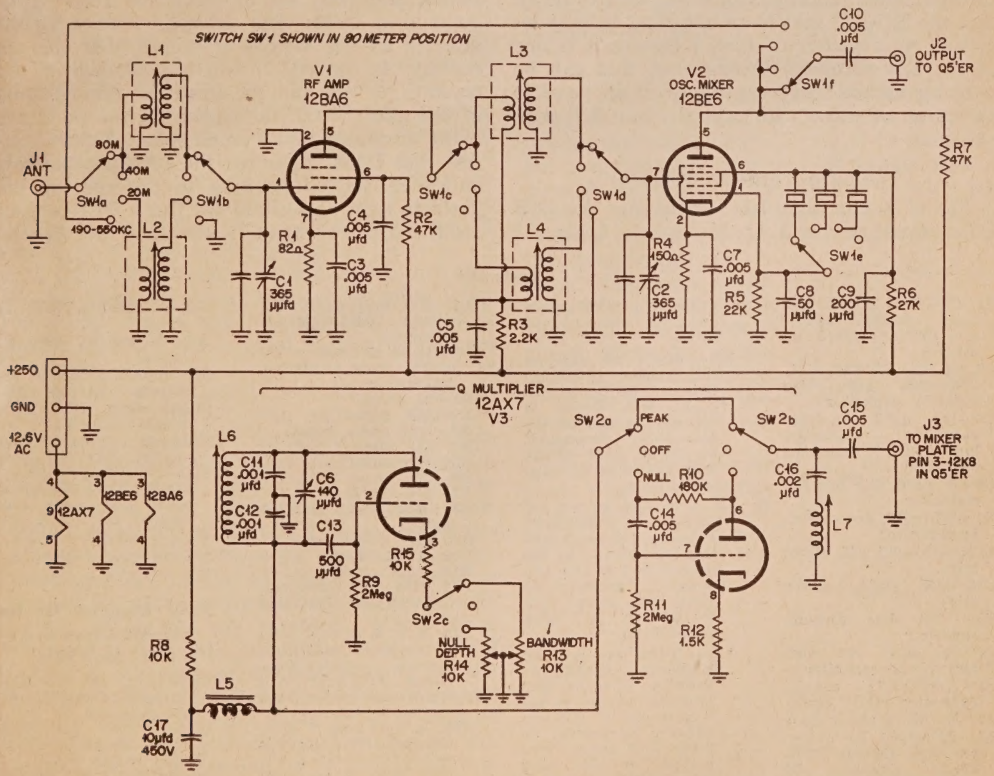


Fig. 2. Schematic diagram of the SSB Q5'er. The 12AX7 section is the Q Multiplier and can be used with the Novice Q5'er also.

Fig. 1—Coil chart for adapting W2AEF's Converter-ettes to the Novice or SSB Q5'er.

Conv. Freq.	L1	L2	Ca	L3	Cb	L4	C7 & C8 silver mica
28 mc.	2 turns #20 enam.	Miller #4404	5 μμfd.	Miller #4404	5 μμfd.	Miller #4403	100 μμfd.
21 mc.	2 turns #20 enam.	Miller #4404	10 μμfd.	Miller #4404	10 μμfd.	Miller #4403	100 μμfd.
14 mc.	3 turns #20 enam.	Miller #4405	5 μμfd.	Miller #4405	5 μμfd.	Miller #4404	100 μμfd.

Miller #4403 9 turns, #22 enam. wire, wound on ⅜" slug tuned form
Miller #4404 12 turns, #24 enam. wire, wound on ⅜" slug tuned form
Miller #4405 19 turns, #26 enam. wire, wound on ⅜" slug tuned form

The June issue fo *CQ* contained a very interesting letter by Fred Nazar, W8RNA. Fred discovered that the 3500 kc crystal could be used on its various overtones and actually made one crystal work for all three bands. This is an excellent idea but does have the disadvantage of locating the 20 meter band down on the low frequency end of the Q5'er dial, where image rejection is not too good. However, for constructors who want to save space (by eliminating the crystals and the band switch), this is recommended reading also. W8RNA also noted that the BC-453 makes an excellent mobile receiver. As a matter of fact, I believe it is one of the few receivers in existence that can be used for mobile SSB reception, with the possible exception of those with crystal controlled converters.

The Single Sideband Q5'er

Fig. 2 is the complete circuit for the SSB Q5'er converter and Q Multiplier. Coils *L2* and *L4* are the added 20 meter *Miller* coils. This converter differs from the Novice Q5'er in that the coils and crystals are switched by a 6 pole, 5 position miniature ceramic switch. Only 3 positions of this switch are actually needed, but it seemed a shame to waste the extra positions. The fourth position of the switch is wired for straight through operation so that the BC-453 can be used with a regular communications receiver. The contacts on the fifth position were used as tie points and the switch stop was set to block the rotor from contacting them. The crystals were soldered directly to the switch terminals. Do this as rapidly as possible to avoid damaging the crystal. As you can see from the photographs of the side view of the converter, the parts are really crammed into a small space. I must confess that I first mounted the tuning capacitor, and then started packing in the rest of the parts as tight as I could get them. The cabinet used to hide this atrocity was an *L. M. Bender*

Parts List

C1, C2—Dual section 365 μμfd. variable capacitor (Miller #2112 or equiv.)
C3, C4, C5, C7, C10, C14, C15—.005 μfd. disc ceramic capacitor
C6—140 μμfd. variable capacitor (Hammarlund APC-140 or equiv., see text)
C8—50 μμfd. disc ceramic capacitor
C9—200 μμfd. disc ceramic capacitor
C11, C12—.001 μfd. silver mica
C13—500 μμfd. silver mica
C16—.002 disc ceramic capacitor
C17—10 μfd., 450 volt electrolytic capacitor
J1—Amphenol coaxial connector (UHF style)
J2, J3—RCA phono jack
L1—2100-6300 kc antenna coil (Miller #B-320A) Primary, 50 turns #30 scramble wound at the ground end of the secondary. Secondary, 50 turns #26 enam. wire wound on ⅜" slug tuned form.
L2—6.0-18.0 mc antenna coil (Miller #C-320a) Primary, 20 turns #26 enam. wire wound at the ground end of the secondary. Secondary, 20 turns #24 enam. wire wound on ⅜" slug tuned form.
L3—2100-6300 kc r-f coil (Miller #B-320RF) Primary, 100 turns #30 scramble wound at the ground end of the secondary. Secondary 50 turns #26 enam. wire wound on ⅜" slug tuned form.
L4—6.0-18.0 mc r-f coil (Miller #C-320RF) Primary, 30 turns #30 scramble wound at the B plus end of the secondary. Secondary, 20 turns #26 enam. wire wound on ⅜" slug tuned form.
L5—100 millihenry r-f choke, iron core (Miller #960)
L6—.5-5 millihenry TV width coil (Miller #6313)
L7—15-60 millihenry TV width coil (Miller #6319)
R1—82 ohms
R2—47K ohms
R3—2.2K ohms, 1 watt
R4—150 ohms
R5—22K ohms
R6—27K ohms
R7—47K ohms
R8, R15—10K ohms, 1 watt
R9, R11—2 megohms
R10—180K ohms
R12—1.5K ohms
R13, R14—10K ohm pot, linear taper (Centralab #B-14)
S1a, b, c, d, e, f—6 pole, 5 position miniature ceramic switch (Centralab #PA-2021 with 4 positions used.) Band change switch.
S2a, b, c—3 pole, 5 position miniature ceramic switch (Centralab #PA-2007 with 3 positions used.) Q Multiplier switch.
X1—80 meters, 3500 kc crystal
X2—40 meters, 6800 kc crystal
X3—20 meters, 6900 kc crystal
Miscellnaeous parts required: Barrier terminal strip (three terminals required)
Cabinet: L. M. Bender (LMB) 753 "Flangelock" Tubes: 12BA6, 12BE6, 12AX7 shielded wire and male connectors for cables
V1—12 BA6
V2—12 BE6
V3—12 AX7

Parts Required for the BC-453 Conversion (CQ, Jan. 1956)

20-20 μfd. 450 WVDC—Sprague TVL-2755 filter capacitor
20,000 ohm pot with SPST switch
Toggle switch SPST
Phone jack (open circuit)
Power transformer: TRIAD R-6A, 480 volt ct., 50 ma., 5 volts, 2 amps., 6 volts, 2 amp

(LMB) 753 "Flangelock." The bginning amateur would be wise to mount the components on a regular chassis of somewhat larger dimensions. The location of the parts does not seem to be critical and the same general layout as the Novice Q5'er should be satisfactory. For those desiring to duplicate the converter construction, the approximate dimensions of the converter chassis and panel layout are shown in *Fig. 3*. Power for the converter chassis is swiped from the BC-453 through a 4 pin barrier strip, mounted on the rear apron of the converter. The B plus voltage can be obtained at *pin 4* of the 12A6 tube, filaments at *pin 7* of the 12SR7 tube, and the ground connection is automatic when the two units are bolted together. However, to avoid getting shocked whenever the units are separated, connect a ground wire between th chassis of the converter and the BC-453 chassis.

Several readers advised me that they were having trouble locating the *Chicago* or *Thordarson* power transformer for the conversion of the BC-453. A short time after the manuscript was published, a nifty little transformer that just fit the bill, was located in the *Triad* transformer catalog. This transformer is *Triad* part number R-6A and because of its small size, is easily mounted on the rear apron of the BC-453.

The converter is aligned in exactly the same manner as the Novice Q5'er, however, on 20 meters the slugs in the 20 meter coils are used for alignment, rather than the trimmer capacitors on the side of the tuning capacitor. Start the alignment job by placing the band switch in the 40 meter position and obtain the loudest signals by adjusting *C1, C2* and the associated trimmer capacitors. Then switch down to 80 meters and adjust the slugs in *L1* and *L3* for the loudest signals. It will probably be necessary to repeat this two or three times until both bands track. Incidentally, the slugs in the coils for the original Novice Q5'er were removed. Although these coils are listed as having a top frequency of 6300 kc, they go well beyond 7500 kc, even with the slugs left in the coil, as in this particular circuit. Once the 80 and 40 meter bands have been aligned, switch over to 20 meters, and peak the slugs in *L2* and *L4* for the loudest signals at some clockwise setting of *C1-C2*. This completes the alignment of the converter section. The inductance, *L7*, in the Q Multiplier section is peaked for maximum signal on any band, with switch *S2* in the off position. When *S2* is changed to the peak position, the signals will probably decrease in volume because of the detuning effect of *L6*. By adjusting *R13* and *L6*, the signals will get much stronger, and as resonance is approached, the Q Multiplier will almost break into oscillation (it will break into oscillation if *R13* is advanced too far) and the characteristic sound (ringing) of high selectivity will be heard. *R13* is a front panel control and is used to control the selectivity. Greatest selectivity will be obtained just at the point where the Q Multiplier starts to break into oscillation. The capacitor *C6* should be set at mid-capacity so that the Q Multiplier can be moved to either side of the receiver band pass after the adjustments are complete. Incidentally, capacitor *C6* is somewhat of a "jury-rig," because it was not possible to find exactly the right capacitor for the job. Actually, a 140 $\mu\mu$fd. *Hammarlund* unit was used, but it was necessary to solder a 1¼ inch piece of ¼ inch brass shaft stock to the rotor, so that a knob could be attached. (This type of capacitor uses a hex wrench or screwdriver for adjustment.)

Changing over to the null position should not decrease the volume to any great extent. However, you will probably notice that when *C6* is adjusted to null out the carrier of an incoming phone station, the station will sound as though it was transmitting single sideband. This is because the Q Multiplier is selective enough to null out the carrier, but leave the voice sidebands intact. By juggling *C6* and *R14*, a point of maximum rejection should be found and in this particular receiver it was about 45 db down. Once *R14* is properly adjusted it requires no more attention, and therefore was mounted internally.

Conclusion

The Single Sideband Q5'er has been used at W6TNS for a period of 3 months now, and during this time I have found it to be one of the best means of copying SSB signals with the possible exception of the Collins 75A4. I personally prefer it to any of the "signal slicers" because it does not leave you at the mercy of the poor selectivity of most communications receivers. For mobile reception, it is unexcelled. Even on rough roads it is not necessary to constantly retune the receiver as is usually the case.

Well, that is about all there is to tell about the SSB Q5'er. ■

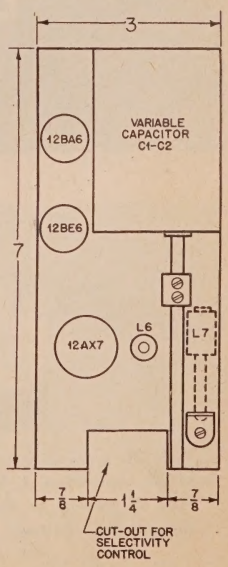


Fig. 3.
Top panel layout



Following the luncheon Saturday many of the YLs gathered for this photo. L. to r., seated: W1QON, W6PCN, W3MSU, W6WSV, W6NZP, W6KER, KN6RDH, W6PVV, W6CEE. Second row: K6QWQ, KN6OHR, KN6QCL, W6QMO, K6EEE, K6POC, W6MBD, W2EEO, K6QFY, W7WLX, W7RAX. Third row: K6EIA, WØBFW, W6JZA, K6HIW, W6BIS, K6HYD, W6PIR, KN6SAJ, W9MMO, KN6SYR, W5RZJ, W7KOY.

YL

Louisa B. Sando, W5RZJ
Jicarilla Apache School, Dulce, New Mexico



These YLs were at the air races Saturday morning of the convention. L. to r., W6's BDE, QPV and FEA, all serving on the AWTAR communications net; W6QPI, chairman of the air race; W3MSU, and W1QON.

It's history now, but the 8th National Amateur Radio Convention at San Francisco July 6-8 will long be a fond memory to over 70 YL's (out of a total registration of over 2,000) who attended.

W6PCN, Peggy, was in charge of all the women's activities, and she was ably assisted by members of the YLRC/SF. A special registration booth for girls was headed by W6QMO, Jeri, and W6PIR, Mary Ellen. Each YL and SW when she registered received a lovely bracelet—charm bracelets with San Francisco, Calif. for out-of-city girls, and gay ones with tiny perfume containers for local girls.

W6FEA, Gertie, who planned activities for the licensed girls, had to spend much of her time at San Carlos where she was in charge of the radio net covering the take off of the Powder Puff Derby.

Something new came into existence at this national convention. Called SWOOP, for Suffering Wives Of Operators Protectorate, it was the brainchild of W6BDE, Esther. Assisting her were K6HIW, Kay, and Elsie, SW of W6BIT. Created exclusively for wives of Hams, it was scheduled for Friday evening when the OMs were attending the opening meeting of the convention. It started



Two Ethels, both from Washington State, met for the first time at the air races during the convention. L. to r., W3MSU (ex-W7FWB) and W7WLX.

off with some group singing, led by Esther and Kay, games and prizes. Then two SWs were invited to do something most all SWs wish for a chance to do—clean up the rig. With dustpan and brush they swept all components out of a chassis (cardboard) and dumped them cleanly into a wastebasket! All SWs were initiated into SWOOP with a ceremony consisting of a SWOOP handshake, password, pledge and song and all received certificates as charter members of SWOOP. Several hundred SWs and YLs attended and all enjoyed it tremendously. Anyone wishing to have a SWOOP initiation at a forthcoming convention may contact W6BDE, Esther, for details.

In addition to all the usual convention activities, YLs and SWs enjoyed a luncheon, planned by K6EEE, Vi, at the Hotel Whitcomb on Saturday.



Formerly of Shanghai, YL Joyce is now KN6QCL, living in South San Francisco with her anglo OM K6JHL and their five jr. ops.

W6PCN, Peggy, introduced W6CEE, Vada, past president of YLRL, who served as a gracious MC. W1QON, Eleanor, and yours truly spoke to the girls, and W6NZP, Evelyn, only two days returned from a year's trip to the Far East, reported some highlights of her experiences and told of the YLs she met along the way. YLs at the head table found lovely orchid leis at their places and each table was set with orchids, all flown from Hawaii, for the girls to wear as corsages. About 90 YLs and SWs attended the luncheon. Youngest in the group were 10-year old Susan, KN6RDH, and 13-year old Sue, K6HIE.

Registration list for the convention included these YLs: W1QON, W2EEO, W3MSU; W5's DUR, RZJ; W6's BDE, BIS, CEE, DXI, FEA, FRL, GEV, GQZ, HEG, JCA, JZA, KER, NMY, NZP, PCN, PCO, PCR, PHT, PIR, PVV, QMO, QOG, QVK, WSV, QPV; K6's CUV, DEN, EEE, EIA, HIE, HII, HIW, IGA, JRL, KCI, KJI, KUP, LAF, OAI, OWQ, POC, QFY, SOQ; KN6's MJH, OHR, QCL, RDH, RRG, SAJ, SBP, SYR, W7's AKX, KOY, NTT, OOK, QGF, RAX, WLX, WTK, ZBQ, ZQG; WL7BQP; W9MMO; WØ's BFW, KQD; K6BMQ.

Our thanks to W6GHI for taking the convention photos. Anyone wishing copies ($1.25 each) may order them via W6PCN, Peggy.

We are very grateful to W6's PCN, BDE, FEA, QMO and MBD for their help in covering the convention news, and especially to W6PCN, Peggy, her OM W6GCV, and jr. ops Drew and Dorothy for their gracious hospitality in giving W5RZJ and family a home away from home during the convention.

Lad 'n Lassies

Although W6QGX, Harryette, is the new Queen of the Clan (of the Los Angeles YL Radio Club),



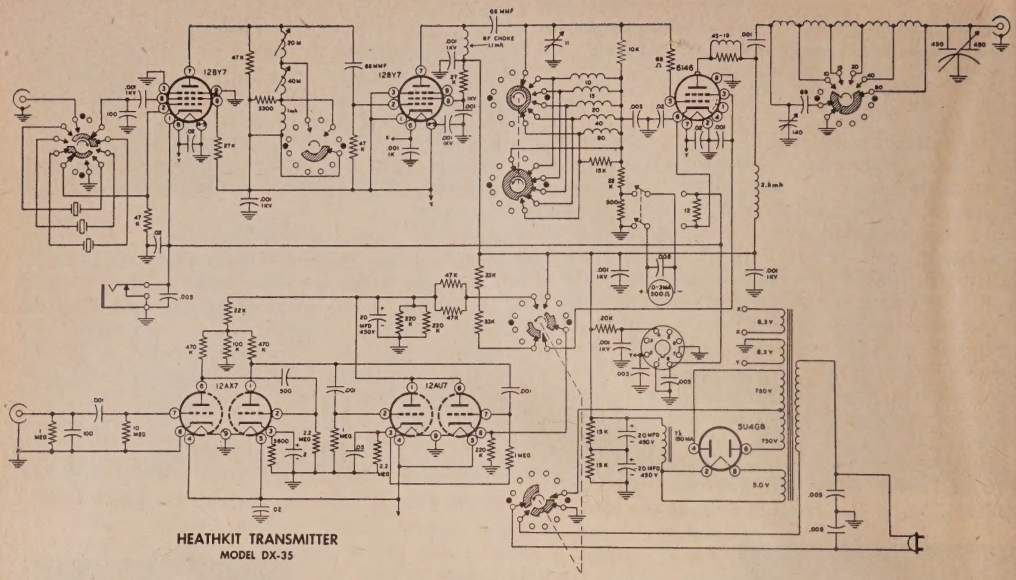
W7OOK, Natalie, brought her pet alligator, Betsy, to the convention from Salt Lake City.

applications for the Lad 'n Lassies certificate offered by the club should be sent to W6KER, Gilda Shoblo, 3715 Liberty Blvd., South Gate, Calif. The ten QSLs must be dated Jan. 1952 or later and a self-addressed stamped envelope should be enclosed for return of the cards. . . . Other L.A. club officers installed in June are W6DXI, Gladys, vice president; K6EJE, Frances, recording secretary; W6WRT, Ruby, corresponding secretary; W6JMC, Mary Kay, treasurer.

33, Louisa, W5RZJ



With W6BDE, Esther, at the mike, these SWs got the chance of a lifetime during SWOOP initiation to clean up the rig.



Art Brothers, W7NVY/2
Associate Editor, CQ

The Heath DX-35

I'll be darned if I know what that "35" stands for. The transmitter runs 65 watts on c.w. on all bands, 10 thru 80, and up to 50 watts peak on phone (the drop comes about since screen modulation is used). It isn't tied in with the price either since the kit costs $56.95. Just one of those things I guess.

Any idiot can put the kit together, I managed. It worked the first crack out of the box too. I'd say that you ought to figure on either a couple nights furious construction or perhaps a week of spare time. As with all the other *Heathkits* I've put together all the pieces were there and the instructions left me with a minimum of confusionment.

Quite a little rig, really. The D-I-T-W (dyed, etc.) ham can always use a spare low power rig around for local QSO's, for the second shack in the bedroom, or to throw in the car for trips. The rig was primarily designed for the Novice since it runs the right power and is simple to use. When the General ticket comes he can plug in the mike and be all set to go. Many of the linear amplifiers on the market will boost this driver to a real healthy signal for DX'ing if you favor the progressive shack approach.

What's in it? OK you engineers, it is all in the ads, but to refresh you it goes like this: 12BY7 oscillator, 12BY7 buffer, and 6146 final. 12AX7 speech, 12AU7 screen modulator. The oscillator and buffer are untuned on 40 and 80. On 20 and 15 the oscillator plate is tuned to 40, and tuned to 20 for final output on 10 meters.

The final has a pi-net tank circuit with a 68 $\mu\mu fd$ condenser added for the two lower bands. There are provisions for three crystals inside the rig which are switchable from the *back* panel. If you want to use more than three crystals you can modify things somewhat and bring a crystal socket out the front panel.

The 600 volt power supply uses two filter condensers in series in the interests of economy and balances them with resistors to stabilize the voltage and act as bleeders. Another interesting power saver is the series operation of the oscillator and buffer, thus eliminating the need for dropping resistors and cutting power consumption in half.

Loading

The DX-35 loaded easily into a dummy load and into every antenna on hand. T-9 reports were received on the c.w. operation and no reports of clicks. The chirp was very slight so all in all this is an excellent c-w rig.

TVI

No TVI was observed on any channel of a ten year old TV set in the same room with the transmitter even when the cabinet of the rig was removed. The TV set was using only an indoor wire for an antenna. What more can you ask for?

Phone Operation

The modulator is an extra. Screen modulation leaves a bit to be desired in efficiency, but



DX-35

it does sound good and you have got phone when you need it for little more than the price of a plain c-w rig.

VFO

Provision is made for plugging in a VFO. Tests were made using the *Collins* 70E8A and full output on ten meters c.w. was obtained with the 3.5-4 mc VFO output. The new *Allied Radio* VFO (more on that next month) gave excellent performance on all bands as did the *Heath* VF-1. There naturally is a tendency for the rig to take off on some unknown but probably FCC monitored frequency if you run it with the VFO turned off. A slight modification of the *Heath* VF-1 makes operation considerably simpler and allows you to turn on the VFO without the DX-35 for zero'ing in on a frequency.

As normally constructed the turning on of either the VFO or transmitter turns on both.

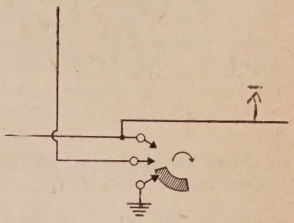


Fig. 1. Wiring of VF-1 function switch.

To modify the VF-1 remove the function switch *(see fig. 1)* and ream out the mounting hole to hold a DPST spring loaded switch. When you ream or drill out the spacer washer be sure to put it in a vise, I don't want any three fingered readers. Connect the wires as shown in *fig. 2*.

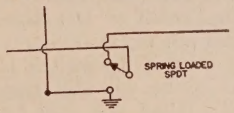


Fig. 2. Wiring of modified VF-1

All in all this is a simple to build, simple to operate rig available at a remarkably low price which you can get quite a kick out of. It is a good thing to recommend to any budding Novices too. ■

Fall Contest Calendar

Contest Calendar for 1956

September	1- 2	LABRE—CW
September	8- 9	LABRE—Phone
September	28-29	MARC—VE/W
October	6- 7	WIA—VK/ZL—Phone
October	13-14	WIA—VK/ZL—CW
October	**20-21**	**CQ W.W. DX—Phone**
October	**27-28**	**CQ W.W. DX—CW**
November	10-11	ARRL—SS
November	17-18	ARRL—SS
November	24-25	RSGB—21 & 28 mc —Phone

LABRE

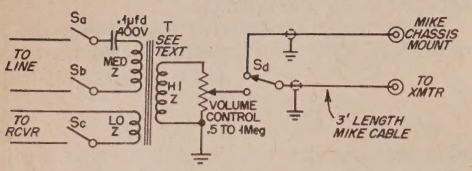
We have had no official announcement from the Contest Committee but based on previous years this contest has been held the first two week ends of September. So keep an ear cocked for our Brazilian *amigos*. Logs should be sent to the LABRE Contest Commission, Caixa Postal 2353, Rio de Janeiro.

MARC

This popular across the border party is again sponsored by the Montreal Amateur Radio Club. U.S. hams will exchange contest QSOs with as many VEs in as many provinces and territories as possible. Our Canadian friends will be looking for Ws in as many ARRL sec-

[*Continued on page 104*]

An Improved Amateur Phone Patch



Herbert Greenberg, W2EEJ
Broadcast Engineer WINS, N. Y.

The phone patch to be described has been found to be very convenient in operation, needing no send-receive switch as it is assumed that the station receiver is silenced when the transmitter is in operation.

The one switch used has enough sections to disconnect the line, switch microphone input, and insert or remove the receiver from the patch simultaneously. The patch is left connected to the line and will not cause difficulty with the phone company even if the switch is left on accidentally. The phone will still ring if calls are received and dialing will still be possible. However if the receiver is left on, the audio will interfere with the use of the phone by the rest of the family, a very undesirable condition indeed, and one that will quickly be brought to the attention of the forgetful amateur.

Theory

The main component about which the patch is designed is a transformer with three separate windings, a medium impedance for the line, a high impedance for the audio input of the transmitter, and a low or medium to match the receiver. Since ample gain is available in the audio stages of the transmitter for use with a low output crystal mike, considerable mismatch is tolerable since the input level of the audio from the telephone line is many times that of a crystal mike.

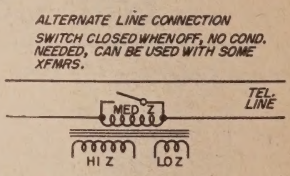
Likewise a large tolerance is permissible in the matching of the line to the receiver. Six milliwatts is the normal phone line level and considerably more than this will cause crosstalk. Since even the lowest priced receivers are capable of a couple of watts output, there is usually no difficulty in obtaining sufficient output from the receiver even with the loudspeaker also operating.

Now it will occur to some that mismatching will cause distortion of frequency response as well as a loss of transferred energy. Working from a low into a high impedance does not cause frequency discrimination, though a full transfer of energy will not take place. If the reverse is attempted, that is, delivering a high impedance into a low impedance, then a definite loss of low frequency response can be expected, depending on how bad the mismatch is. In the case of a phone patch, quality is not of the essence, nor even particularly desirable. The telephone company does its best to limit the frequency response to voice frequencies and precious little of high fidelity will be heard on the other end anyway.

Practically, the patch works because there is a fair match of impedances and ample reserve available in the voltage amplifier of the speech amplifier of the transmitter as well as in the output of the receiver.

Construction

It is best to mount the components in a metal box, preferably of a ferrous material, since there is better shielding at audio frequencies with iron or steel than by aluminum, copper, or brass. The wiring does not have to be shielded if it is properly enclosed. However a length of shielded mike cable should be used from the patch to the transmitter input. If push to talk is used, choice of the proper cable and connectors will permit the full use of this function.



The condenser should not be more than a .1 since this is satisfactory for speech frequency response and will not unbalance the line if the patch is accidentally left in the phone circuit. The voltage rating should best be about 400 volts since the ringing voltage to which it may be subject is over 100 volts. The main purpose of the condenser, however, is to keep the carbon mike current of the telephone from being shorted by the transformer winding.

The switch is available as a standard item. A four pole double throw non-shorting type of phenolic wafer is satisfactory and other types

can be adapted if enough sections are on hand.

The transformer will vary with the available junkbox supply, the surplus counters within reasonable travelling distance, and the pocketbook of the constructor. Three windings, isolated from each other, and from ground, and having low, medium and high impedance are the target. Compactness is also desirable since mounting in an enclosed box is preferred. A fair number of surplus MCW oscillator transformers with sidetone windings can be cannibalized from old ARC5, BC-375, or other war surplus gear. A plate to push-pull grid, with separate grid windings might be a possible substitute. The plate windings of any of the above would be used to match the medium or telephone line impedance.

A small power transformer, even a 400 cycle surplus unit will nicely fill the bill. The 110 volt primary becomes the medium impedance winding, the high voltage (or half of it) the high impedance winding and naturally the filament winding is used as the low impedance to match the receiver output. When the switch is placed in the "out" position it acts to completely disconnect the patch from everything and restore the station mike to normal. When the switch is turned "on," the transmitter, the receiver and the phone line are all connected through the common transformer and the patch is working. The station mike is switched out and will be "dead."

Installation

Remove the microphone connector from the transmitter speech input and replace it with the shielded mike cable from the phone patch. Connect the microphone to the patch at the connector provided.

Using unshielded ordinary twisted pair, connect the patch to the leads on the phone line with red and green tracer markings. If a plug type phone is used, wrap the bare ends of the leads around the two pins spaced the furthest apart on the plug and re-insert into the jack.

Connect a pair of unshielded leads to the receiver. If terminals are on the back of the set, don't even warm up a soldering iron. If you have an inexpensive set, solder the leads from the patch to the receiver voice coil. Do not disconnect the speaker unless you intend to use the patch late at night, in which case it may be better to be able to switch the speaker off. Many receivers have the headphones fed from the secondary of the output transformer and the leads from the patch to the receiver can be terminated in a PL-55 plug inserted into the receiver, which makes for a considerable increase in operating convenience.

With some receivers, a 500 ohm output is available and may match the receiver to the line with better efficiency, and should be tried. Again do not disconnect the speaker unless silencing is desired. A switch can be wired in to do this.

Operation

OK, now you are all set to try it out. Tune in a station on your receiver, turn the patch switch on, and pick up the phone. Gee, listen to the dial tone. Now dial a number greater than one and it will eliminate the tone for about thirty seconds. Don't dial operator! Call a friend if you need more time. Listen for the receiver output and adjust the receiver volume for loud, but not uncomfortable signal, on the telephone receiver.

Now turn on the transmitter. The receiver should be silenced by the normally used relay or by hand switching. Speak softly into the telephone and advance the gain control on the patch, until approximately normal modulation is obtained. Leave the gain control on the patch at the setting obtained in order that no major adjustments be necessary when switching from mike to patch. Remember that the local, i.e., your voice, is about ten times as loud as that of the party on the other end of the line, and it will be advisable for you to speak softly, or partially cover the mouth-piece, or both to avoid overmodulation while operating the patch.

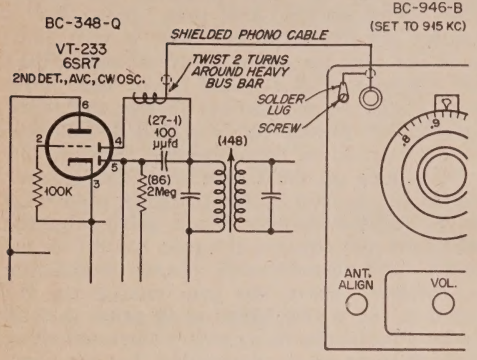
If feedback is experienced, it may be due to RF floating about the shack and must be eliminated. An additional ground other than the mike cable shield may be helpful. Acoustical feedback, if the speaker is left on, can be eliminated by physically moving the telephone handset away from the speaker and partially covering the phone mouthpiece.

It is best not to put the dialing pulses on the air, so don't switch in the patch until after the call is placed. Remind the party on the other end that only one way at a time conversation is possible (unless you have SSSC and voice control break in). They will get used to it quickly, and generally be very thrilled with the idea of speaking to someone far away by short wave radio. You can usually expect profuse thanks.

Conclusions

1—Watch out for the increased phone bills. Don't hesitate to reverse the charges if possible. 2—Don't leave the patch on after completing a patch call. The rest of the family won't appreciate DX overiding their phone conversations. 3—Your mike won't operate either. 4—Read all the phone patch articles recenty published in CQ. 5—Don't throw away the patch after the novelty has worn off—pass it along to the next victim. 6—Don't tie the phone up for long periods of time. Phone patches are not appreciated by other members of the family, strangely enough. Homes have been broken up by less. 7—Don't pay the next phone bill. Have the phone removed. 8—Go back to CW. Enjoy ham radio again! ■

Improving Selectivity of the BC-348 —Without Pain



Joseph L. Boswell, W7KEG

5613 S.E. 41st Ave., Portland 2, Oreg.

The method of achieving near single-signal selectivity here described is not original, but may not have occurred to many amateurs who have struggled to drag the other guy's signal out of the mud of crowded ham bands. Of course, the best solution is to buy a new receiver for two or three hundred bucks, if you can afford it. If you can, stop right here. If not, read on.

The heart of this system is the broadcast band receiver of the SCR-274-N Command-set series, known as the BC-946-B, which is used as a Q-5'er. These receivers may still be purchased at a reasonable price which will be more than justified by the improved results obtainable from the BC-348-Q. But we are getting ahead of the story.

The first thing, of course, is to put the BC-348 in apple-pie order. If you've had it for a couple of years the chances are that it needs a little attention. First, check all tubes and replace any that are not up to snuff. (It might be a good idea to do the same for the BC-946-B also, while you're at it.)

The next step may be omitted if you don't want to tear into the innards of the BC-348 receiver. It consists of soldering a jumper across the .002 μfd. condenser (22) which is in series with the antenna binding post and the antenna coil. Also, if your receiver has been modified to include a 1-megohm static drain resistor from antenna to ground—remove it. You may want to install a small neon bulb in place of the resistor, particularly if considerable r.f. is present at the antenna binding post when the transmitter is on. A bulb such as the NE-51 will be quite satisfactory to keep the antenna coil from frying.

Third, completely re-align the BC-348 receiver, making certain the i-f stages are aligned to the frquency of the 915 kc crystal filter. This should be done only after any weak tubes have been replaced. If you haven't the equipment for this step, skip it, but you will have to peak up the antenna trimmer for each band after shorting out condenser (22). This can be done by tuning in a fairly strong signal with the receiver set on "MVC". Then, with an insulated screwdriver, adjust the antenna trimmer for the band in use for maximum signal. Do this for each band, with the antenna to be used on that band connected to the receiver.

Fourth, convert the Command receiver BC-946-B for a-c operation. Several firms market kits for this purpose. The one advertised in this magazine by Offenbach & Reimus of San Francisco works very well, or you may build your own power supply. The receiver requires 24v. @ .45 amp. a.c. or d.c. for the heaters and 250v. *maximum* @ 40 ma. for the plates. The Command receiver will operate satisfactorily on less plate voltage, down to about 105v. For this application, about 125-150v. seems adequate.

Fifth, obtain a length of shielded single conductor wire, such as is used for phonograph pickups. Strip the braid back about two inches and form a pigtail. Locate the heavy lead in the BC-348 that connects from *pin 4* of the VT-233 (second detector diode plate) to the third i-f transformer. Wrap two turns of the inner conductor firmly around this lead and solder the pigtail to the closest convenient ground point. Drill a small hole in the back of the receiver cabinet, fit with a grommet, and pass the shielded cable through it. The other end of the shielded cable is connected to the antenna post of the BC-946-B The braid is connected to ground by a soldering lug slipped under the screw located to the lower left of the antenna post.

Sixth, replace the BC-348 in the cabinet and warm up both receivers.

Operation

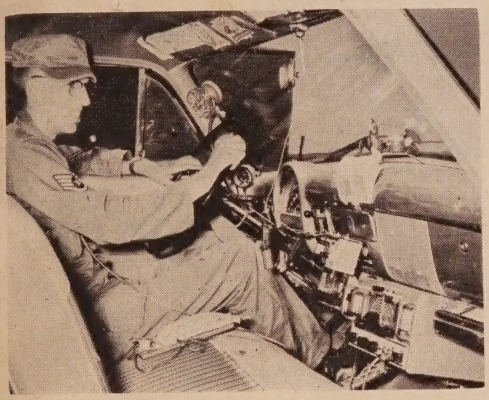
Tune in a 'phone signal on the BC-348 in the conventional manner. Transfer the speaker or headphones to the output of the BC-946-B, and tune the latter to 915 kc. Adjust the antenna trimmer knob for the loudest signal with the gain control of the BC-946-B backed off to keep the signal at a minimum. Readjust the frequency selector of the BC-946-B for the desired signal. Heterodyne interference may be reduced by use of a Heterofil, or by use of one of the FL-5 or FL-8 Range Filters set to reject a 1020 cycle note, then juggling the receiver controls so that the heterodyne is at 1020 cycles. Note

[*Continued on page 115*]

Answering A General Call

Jim Washburne
Editor THE BEACON
March AFB, Calif.

As an apparently ordinary CQ from Omaha, Nebraska fanned out over a portion of the American midwest, K6MPI, U.S. Air Force Staff Sergeant Lawrence G. Dodd, on leave from March Air Force Base, Calif., and driving in his car on U.S. Highway 89 in Southern



Utah, was lazily scanning the 20-meter-phone band.

It was June 16, at about 7:00 in the evening. He heard the general call from station "KØGRL, Offutt Air Force Base, Omaha, Nebraska." The alert sergeant quickly tuned his transmitter and shot back, "KØGRL at SAC Headquarters, Nebraska, this is K6MPI, mobile-in-motion #7, between Zion and Bryce National Parks in Southern Utah. What say, old man?"

The "old man" responded shortly with the information that he was a new operator, going on the air for the first time with a *Globe King 500-A* transmitter. He continued to describe his equipment in the enthusiastic terms of the newly-licensed ham, and a friendly conversation ensued.

Sergeant Dodd repeatedly asked the Nebraskan for his handle, but was met with evasive answers. His questioning revealed nothing more.

Recalling an earlier point in the transmission, the Omaha operator asked how Dodd knew of SAC Headquarters. "Oh, I'm one of 'Poppa' LeMay's boys," was the sergeant's jovial reply.

Bits of information snapped back and forth until about 7:15, when they signed off. Sergeant Dodd sent a QSL card to KØGRL, c/o SAC Hq., and promptly forgot about the contact.

It wasn't until some weeks later, when he returned to March AFB at the end of his leave, that he discovered a letter in his mailbox, postmarked in Omaha and bearing the Headquarters SAC letterhead.

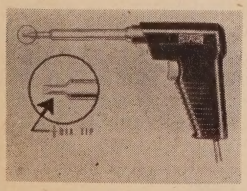
"Dear Sergeant Dodd," it said, "Thank you for your card. I completed my exam just last week and set up a station. You were my first contact; as a matter of fact, my first call.

"I was glad to get in touch with you and hope to stir up a little more interest in amateur radio.

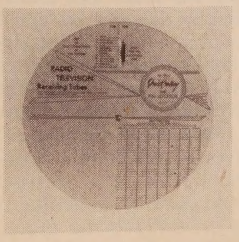
"I don't have my cards yet—will send you one when they are made up."

When Sergeant Dodd answered this CQ, he didn't know how much of a "general" call it was—for the letter was signed, "Sincerely, Curtis E. LeMay, General, USAF, Commander-in-Chief." ■

New Products



Attention men! Toss out that 19¢ soldering iron with the frayed cord and the tip that vaporizes solder and latch on to this new Hexacon Instant Soldering Gun. It's a beauty, isn't it? It combines a small, ⅛" tip with a 150 watt heating element, and has a long reach for getting into tight places. The weight of the gun is only 8 oz., since it is of a new design that eliminates the usual step-down transformer. Made by the Hexacon Electric Co., 591 W. Clay Ave., Roselle Park, N. J., this soldering gun is a steal at $7.95, list. Drop by your dealers and see it! That's the best tip (pun) we can give you.



Confused by the pin connections of the new 13-CD8-GTX double triode, high mu heptode-pentode-tetrode? You aren't the only one. This computer will cure your tube-pin blues in a hurry. It is a Tube Pin Locator! Set the dial of the computer to the tube number, look at the scale and there you are! All the pin connections laid out for you for that particular tube! I just can't see why this wasn't thought of before. Once you have one, you will see how much time it saves for new construction or service work. The Quick-way Tube Pin Locator is made by the Airport TV and Radio Co., 188 Airport Road, Reno, Nevada. (Wonder if they are near Harold's Club???)

Robert B. Kuehn, WØHFK
641 S. Saratoga St.
St. Paul 16, Minnesota

The A-C Test Lamp

Simple, cheap and useful. The Spartan lines of the schematic prove its simplicity. With so few parts it could hardly be other than cheap, but is it useful? I think it can easily be proven so but, for the sake of orderliness, let's first of all consider the few constructional details.

The A-C Test Lamp can be built either as a permanent workbench feature or as a portable affair. In either case, it consists merely of a porcelain or bakelite lamp socket, appropriate lengths of fabric-covered lamp cord terminating in a pair of clips with rubber insulators, a toggle or knife switch, and a plug cap.

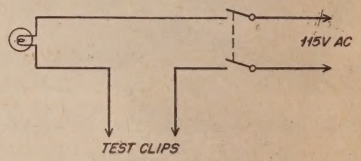
As the schematic indicates, the lamp must be in series with the hot or ungrounded side of the a-c line. When the Test Lamp is finished, take two lamps of the same wattage rating and insert one in the socket and the other between one test clip at a time and an electrical conduit or water pipe ground. Correct orientation of the plug will be shown by both lamps lighting simultaneously. File a notch in one side of the plug cap and be sure that it is always plugged into the receptacle correctly before using the Test Lamp. Remember though that, like the mark on the side of the fishing boat, this may or may not hold true when used at a different location.

The two pole single throw switch isolates the test circuit while you are making connections to give you further protection.

The A-C Test Lamp shines brightest (figuratively speaking, of course) in solving the common problem of which lead is which on power and filament transformers of any size, make or vintage, without danger to either the operator or the equipment being tested.

With a 75- or 100-watt lamp in the tester, place the transformer to be tested upside down on the workbench. Fan out the leads and clean the ends of insulation. Begin the test by connecting the test clips across various pairs of leads, pairing those across which the test lamp lights. Filament windings, being made of heavy wire with few turns, will have but little resistance and the lamp will burn with full brilliance when connected across them. Primary windings have considerably more resistance (and reactance) and can be identified by the test lamp lighting to probably no more than quarter or half brilliancy, brightening up noticeably when any other winding is shorted out temporarily. No harm will come from shorting windings for test purposes, since the test lamp will limit the current to safe values. If no indication is obtained when using the 75- or 100-watt lamps, reduce the lamp size until an indication is obtained.

High voltage secondaries have the most reactance. Since they are virtually always center-tapped, there will be three leads. If all other leads have been accounted for, then by the process of elimination the remaining three must be for the high voltage winding. Usually not enough current will be passed to permit lighting the test lamp at all except possibly when using a 7½-watt lamp. Upon close inspection a spark can be seen when making or breaking contact at the leads, indicating continuity between them. The high voltage winding can be further identified by connecting the test lamp across the primary. Shorting either end of the secondary winding to the center tap will cause the test lamp to brighten by the same amount.



Circuit of A-C Test Lamp.

Filament windings are also sometimes center-tapped, especially on older types of transformers. In the absence of a voltmeter, such leads can be determined with the aid of a filament-type tube such as an 80, 5Z3, etc. The filament will light brightest, of course, across the two outside ends.

Some transformers have a single, uninsulated lead along with the others. This is connected to an interwinding electrostatic shield for noise reduction and should be grounded to the chassis when the transformer is in use.

While testing transformers with the A-C Test Lamp eliminates the danger of blown fuses, it should be remembered that practically full voltage is being delivered by the secondaries, and the usual precautions against receiving shocks should be observed.

Other Uses

With a 7½-watt lamp in the socket, the A-C Test Lamp becomes a nearly universal continuity and short checker. Since a lamp of this size draws only 100 ma. of current it can

[*Continued on page 127*]

LX Expedition from ON4-land

Louis (Bob) Berge, ON4QX

From its inception, our little project seemed obstructed by insurmountable obstacles. Details of administration, travel, customs-clearance, official documents, etc., were like a wall of red tape. Finally the license came through and gradually all the other obstacles fell away.

ON4FU and I left Antwerp with most of the equipment on a dirty, rainy Friday noon. Our licensed power was limited to a modest 35 watts so the rig we took along consisted of a phone-CW all band affair with a 807 in the final running about 30 watts. The receiver was a *Hallicrafters* S-85.

Once we got through customs into Luxembourg we reconnoitered all of the little mountain villages in the Wiltz area searching for the highest spot to operate from. Stamping around in the pouring rain seeking permission to use various places as an operating site, we looked more like bandits than gentlemen, and weren't too surprised at the cold reception we got everywhere we went. As time wore on, and the operating hours our license authorized drew closer, we grew more alarmed and more frustrated at each refusal. Just before dark, and with only a few hours to go until our 48 hour authorization began, we came to the village of Berle, located near Wiltz at 50 degrees north and 5 degrees 9 minutes east at an altitude of something over 1500 feet. Here we ran into a good Samaritan, and suddenly our search was over.

He was a little Luxembourg priest named Hostert, the padre of this very tiny village of Berle. And what a padre he was! He had never heard of hams before. He couldn't imagine why anyone would be touring the country in this kind of weather. But he listened to our story, smiled in sympathetic tolerance of the vagaries of man, and turned over to us his church belfry for a shack and the electrical service in his pastory for power.

We plodded back and forth from the car to the church tower in the pouring rain, lugging our gear to the operating site. We laid cables from the shack to the pastory for power feeds. Finally we got to the herculean task of hanging a sky wire from the belfry and running it down into the valley beyond. And at last, with our installation complete and the rig tuned up, zero hour arrived.

We called a confident CQ, and sat back to start logging calls. There were none. Not even one. So we tried again, longer this time. Same results. We looked at each other with that sunken feeling in our bellies; were all this time and effort to be wasted because we just couldn't get out? We shrugged in despair, and called a third CQ, hoping against hope to raise *some*one, *any*one. And this time we did. Only it seemed like we'd raised *every*one! We heard stations calling us literally by the dozens. The band sounded like a contest was afoot, with all the participants using our call.



Chief Leader ON4QX/LX. Padre Hostert.

Contests are fun, but an expedition is hard work. You want to give everyone a chance, the good signals and the weak ones, so you operate until you're blue in the face, and then you operate some more. ON4FU started his stint at midnight, our zero hour, and I hit the sack. When I relieved him Saturday morning, the poor devil was completely exhausted. Seven hours of breakneck operating in a cold, damp tower without food or drink had really taken its toll. I sent him to bed and manned the key myself, scarcely able to believe my ears. For during the entire time we were on the air there were always stations calling us; we never had even to QRZ, but just picked a signal, acknowledged, exchanged reports, and picked

[*Continued on page 98*]

DX

Gathered and reported by
R. C. "DICK" SPENCELEY, KV4AA
Box 403, St. Thomas, Virgin Islands

Heartiest congratulations to the following station upon his entry to WAZ:

No. 323 W8TTS FLOYD R. MYERS 40-221
(Twelfth W8 WAZ)

We also welcome the following newcomers to the HONOR ROLL:

ON4QX	39-158
EA4CR	38-180
OK3EA	38-128
IT1TAI	37-173
W1QJR	36-155
W3CPB	35-142
CT1PK	36-182 (PHONE)

YASME EXPEDITION: VK9TW: Danny arrived at NAURU ISLAND at 0630 GMT on July 14th after a relatively speedy trip from CANTON ISLAND. A short stop was made at OCEAN ISLAND to effect repairs on his transmitter but he was not on the air from this spot. On NAURU, setting up the gear in temporary quarters, Danny came on the air at 1042 GMT, July 15th. DX stalwarts, well advised of his impending appearance, were on hand to get NAURU under their belts and gave this operation a slam bang start QSO-wise. First contacts were made in this order: KV4AA, KR6QN, W3JTC, W8PQQ, W3MSK, W8DMD, W8HGW, W4IHN, W8JBI, W8JIN, WØGUS, W1BFT, W3ECR, W2PCJ, KV4BB, W9LNM, W3JNN, W6NNV, W8OCT, W3MFJ, WØJRI, W1KFV, W7RT, W3RTB, W2SUC, W6NIF/4, W8TMA, W3BES, W6TSW, W8BHW, W3LMA, W5DGV, WØNLY, W1GKK, K5AYA, W1LZE, KR6SC, JA1CJ, W1FH, W1TW, W3ESV, W4AH, LU6DJX, W9HUZ, W2HMJ, W7EMY/KH6 and W9YFV, etc., etc. Danny reiterates his heartfelt thanks to all of the gang who, by their kind contributions, have made the purchase of his new ORLON sails possible. Sailing is now a definite pleasure! As the YASME trip is YOUR expedition the time spent at any particular stop will be governed by the number of QSO's made. It is estimated that a five weeks' stay should enable any station to contact him who is so minded. Approximately 4000 contacts should also do the trick. His extended stay at VR1B, Canton Island, resulted in about 4800 QSO's with activity tapering off sharply during the last month. Many of these were "repeats." Due to our efforts sail and gear-wise the YASME fund is slightly in-the-hole. Further contributions, with QSL, would be most appreciated. Next stop, Guadalcanal, VR4.



Mighty cute, we'd say, is Ryoko, JA6KH, who seems to be hearing a very rare one. (Photo courtesy JA6AA)

AVES ISLAND, YVØAA: Thanks to Luis, YV5BZ, the following results of this expedition can be quoted: YVØAA came on the air at 1640 GMT, June 17th, and closed down at 0430 GMT, June 24th as per schedule. Operators in attendance were YV5GC Chairman RCV, YV5FR Vice-Chairman RCV, YV5BZ, Secretary and QSL Mgr. RCV, YV5AE, YV5EC, YV5DO, YV5GO, YV5BI, YV5BV, YV5EQ, YV5FA, YV5HA and YV5GY. 1761 contacts were made with 743 being on phone and 1018 on CW. The first 20 QSO's were: HK1JO, CO7KK, YV5AB, W1FH, K4AIM, TI6AL, TG9MQ, W8BF, W2JT, CO2BL, CO2BK, HK3AU, W3KT, W1ADM, W3GHD, HK3AB, HK4DF, TG9RR, TG9TU and TG9SE. 128 countries were worked, 72 on CW and 56 on phone. First contact in each W call area was: W1FH, W2JT, W3KT, K4AIM, W5FEC, W6GPB, W7ADS, W8BF, W9UXO and WØJMB. Continental firsts were: HK1JO, W1FH, G3AWZ, EA9AR, 4X4DK and VK2ACX. 1048 W contacts were made with phone and CW district totals as follows: W1 21/70, W2 35/108, W3 31/73, W4 51/85, W5 30/51, W6 2 /186, W7 6/43, W8 43/69, W9 11/56, WØ 14/41 (266 phone, 782 CW). YVØAA appeared on 3.5, 7, 14, 21 and 28 Mcs. No luck was had on 6 and 2 meters. YV5BZ states that he considers a minimum of 500 watts plus beam antennas is most necessary for a good DX'pedition. Many lessons were learned which will be applied towards the next expedition. Daily weather reports were received but they consistently halved the wind force which continually blew at 20 knots and, at one time, had the boys a bit worried by reaching 45 knots. The island's permanent residents, the birds, amounted to only about 100,000 (no actual count!) and the boys soon got accustomed to their constant shrill (day and night) cries and, except when one would

hit the resonant frequency of an incoming CW signal, we all got along very nicely! The sun was hot but due to the permanent winds it was not felt too much and we were always fresh. The island's odor, courtesy of the birds, was also kept on the move by the wind and was not found objectionable. All QSL's should be out by now but if any are missing please contact YV5BZ. We hope to have a story, covering this jaunt in detail, in an early issue of CQ. Thanks, boys, for a job WELL DONE!

Our Cover

DUTCH/FRENCH ST. MARTIN, PJ2MC/FS2RT: Reg., W6ITH, paid a return visit to this island during June and early July. Approximately 4000 contacts were made from PJ2MC with a great number of European stations QSO'ed. Operation from FS7RT was not originally planned but with his flair for doing things in grand style Reg had *another* KWS-1 and 75A4 set up on the French side, ten minutes drive from PJ2MC, which was responsible for 1000 more QSO's from FS7RT, during the latter days of his stay.

SAN MARINO, I1DCO/I1BRN/M1: June 29th and 30th witnessed a return visit to this rare spot by I1DCO. He was accompanied by I1BRN. See QTH's.

LUXEMBOURG, ON4CK/ON4BQ/LX: This pair DX'peditioned to this QTH between July 14th and 29th, dispensing many QSO's. All bands were used. Also active was native LX1DW, Jim, who was heard on 14 CW. Some DL's were due to have been heard from here during August.

REUNION ISLAND, FR7ZC: This station has shown increasing activity around 1300 GMT on 14070. QSL's should go to: Paul Ferrand, Trois Bassins-es-tol Bornes, La Reunion Island. Paul is an old F3. (West Gulf Bulletin)

FRENCH SOMALILAND FL8AB: This rare one, apparently genuine, has been worked near 14030, 1300 GMT. Gives QTH as Djibouti. Suggest QSL via French REF. His name is Guy and he has also been heard around 1945 GMT.



Her opposite number, JA6HK, makes music during a lull in DX conditions.

LAOS, XW8AC: PY2CK advises that Lucien, XW8AC, is active on phone, 14100, every day around 1000 GMT. QSL's go via Box 87, Vientiane.

ZANZIBAR, VQ1JO: Just a reminder that ZE3JO plans to be on from VQ1JO from August 14th to September 4th. Power, 20 watts.

SPITZBERGEN, LA9PA: LA4DD says that LA9PA/P is active from Bear Island (Counts same as Spitzbergen). He comes on after 2200 GMT and is VFO, CW, 7 Mcs. only. He also advises that there will be an expedition to this spot in August 1957 equipped with Collins gear. SM5ARL advises that SM5KV/SM8KV will go to Spitzbergen between August 3rd and 17th (1956). Operating permission has yet to be received from the Norwegian authorities. Frequencies will be 7027, 14054 and 21081.

ANDORRA, PX1EX: We have it that PX1EX will pay a return visit to Andorra and be active from August 6th to 24th.

ILES GLORIUESES: FB8BK plans a DX'pedition to this QTH (Just North of Madagascar) some time in December. He will sign FB8BK/FB. (Separate country?)

MONACO, 3A2BH: We have a report that HB9KB will be on as 3A2BH between September 9th and October 10th.

BONIN ISLANDS, KG6IG: Via W7PHO we are advised that KG6IG will be on most days, and especially week-ends, from the Bonin Group which counts same as Iwo Jima, KAØ. 100 watts are run to a Vee Beam and the following schedules will be maintained: CW, 14050, 1100 to 1200 GMT. CW, 7175, 1200 to 1300 GMT. Phone, 14240, 0800 to 1000 GMT.

SOVIET ANTARCTIC BASE, UA1KAE: This station has been very active on 14 CW, VFO, and heard from 0100 to 0400 and 1030 to 1230 GMT. The name is George and home station is UA3DQ.

GUADELOUPE, FWI, FG7XC: This station has been active 1130 to 1300 GMT (etc.). QRG 14030/14070. At time of writing his QSL's are being printed. He may be reached at the following QTH: Pierre Rainzet, Airport, Guadeloupe, FWI.

SPITZBERGEN (again): We hear the LB8YB will appear from this QTH around September (Hope all this smoke results in a little fire!).

GOUGH ISLAND, ZD9AE: Looks for W stations from 1300 to 1800 GMT, near 14060, long path.

DX Notes

Leny, VQ8CB, pulled the big switch at Chagos on July 9th. He will arrive in Mauritius about

July 16th for further assignment . . . PK5AB was QSO'ed by PY2CK, 14100, 1500 GMT . . . ZS8L says all QSL's were mailed, via bureaus, by June 23rd . . . AP2BP, SSB, 14305, has been skedding W8PUD at 0100 GMT . . . DM2ADL reports UL7KBA runs 7 watts on 7 Mcs. UM8KAA is also on 7 Mcs. with QRP . . . PY2CK reports UL7AM, phone, 14125 at 1400 GMT . . . YA1AA has been fairly active, 14027, giving name as Bob. QSL via ARRL . . . News of the AC gang comes via W6YY and W9YFV and we hear that AC5PN is on with limited gas supply. Chhawna needs a pair of 6V6's to put him on phone. AC4NC is active on CW only and is experiencing some generator trouble which should be cleaned up by now. Saja, AC3SQ is on phone and CW while AC3PT also has A3 and A1 but is not very active . . . FR7ZC is ex-F3JW, 14060, 1215 GMT . . . FB8YY will be the official call for Terra Adelie, French Antarctica . . . Via the West Gulf Bulletin we hear that Fergus, MP4QAL, went QRT on June 13th. A Persian Gulf round-up on 7 Mcs. occurs every Friday morning with MP4's: BBL, BBX, BBF, BBW, QAP, KAB and KAC participating. Jim, MP4QAP. who is also QRT now, says, Sheik Ali of Qatar, MP4QAI, will now send out QSL's. MP4BBL has new 3 band beam. MP4TAA at Sharja in Trucial Oman is QRT. His replacement has the same call but no gear . . . KJ6BN is now QRT and awaiting new assignment . . . I5RAM is active from Italian Somalia, 14075, 2200 GMT . . . Looks like W6NJU's Navassa trip is off this year. Snag came in transportation between Cuba and Navassa. Price of $1500.00 was quoted! . . . VR2BC and VR2BZ plan DX'pedition to ROTUMA ISLAND, some 300 miles NW of Fiji. Don't think this would qualify as a separate one as it seems to come under the Fiji orbit . . . Jim, VS2DQ, reporting on VS activity says VS5NN is probably a phoney. ZC2 activity is nil, none licensed. ZC3AC is OK on Christmas Island but not active at present (Ed—he QSO'd a couple of W6's the other day). Legit at VS4 are VS4BO, VS4NW and VS4BA. In VS5-land only VS5AT is licensed and he is on leave in England. In ZC5 none are believed active but ZC5SS and ZC5VS are licensed. VS2 licenses are in the F series with the latest being VS2FE. Anything heard like VS2XX etc. would be NG. (Tks W4RBQ) . . . Peter, VK9RM, now moves to VK5 after 20 years in New Guinea . . . Via OK1MB we hear that VS1GV will go to ZC5 for a year and ZC3AC will be heard on 21 Mcs . . . VQ3CF QRT's fo a year's leave after which he will return and re lieve VQ3BM at Mwanza . . . W4HKJ advise that he would be glad to handle QSL's for an DX station needing help . . . Via VK3IB, ex VK1AC, we hear that VK1IJ holds the fort a Macquarie with VK1RD also licensed. VK1GA i the only representative from the Mawson Antarcti Base and works CW only, 14100, around 0915-1030 GMT. VK3IB hopes to be on again nex year as VK1AC from some location . . . FB8XX should be on again by the end of Summer . . . CR5SP (Sao Tome) is active on 14045, 0730 GMT, with CR6AI as Emcee as CR5SP very QRS on CW . . . OK1MB reports VK9RH (Norfolk Is.) active on A3, 21160, and ZS9G, also A3, on 21120.

Addresses

AP2U ..... M. Noor Mohamed G. Roberts Market, Quetta, West Pakistan.
FG7XC ..... Pierre Antenor, Raizet Airport, Guadeloupe, FWI.
FL8AB ..... Via R.E.F.
FR7ZC ..... Paul Ferrand, Trois Bassins-es-tol Bornes, La Reunion Island.
FS7RT ..... Via W6ITH.
FY7YE ..... Via W5JLU.
I1DCO/I1BRN/M1 Via I1DCO, Gino, Box, 20, Ferrera, Italy.
KG6FAA ..... Box 22, Navy 3080, FPO, San Francisco, Calif.
KV4BQ ..... Rev. Ed Turner, Box 745, Frederickssted, St. Croix, Virgin Is.
LX1DW ..... Via LX1AB.
ex-MP4QAL ..... Fergus Walshe, 14 Mt. Marrion Ave., Blackrock, Dublin, Eire.
OD5LJ ..... Via W5DGV (With stamped self-addressed envelope).
PJ2MC ..... Via W6ITH.
ex-VK1AC ..... VK3IB, Box 35, Dimboola, Vic. Australia.
VK1GA ..... (Mawson Antarctic Base) G. L. Abbs, 2 Hubert St., Harbord, N.S.W. Aust.
VP8BT ..... Ossmund Connochi, Base F, Argentine Is. c/o Port Stanley, Falkland Is.
VQ4FI ..... Box 777, Nairobi, Kenya.
VR3D ..... C. H. Freeman c/o So. Pacific Airlines, Honolulu, T. H. (Christmas Island).
VS1HB ..... Harry Acomb, R.A.F. Seletar, Singapore, Malaya.
W2AIS/VK ..... Via W2BAK or W2 Bureau.
W3UXX ..... (New) John Shute, 130 Henderson Ave., Norwood, Penna.






To cool you off during these warm days we present some shots of Macquarie Island during VK1AC's stay in '54. a: Chas, VK1AC, at the 100 watt rig. b: Main camp area, Macquarie Island. c: VK1GA (now at Mawson), K. D. Short, Auroral Physicist, VK1AC and VK1DJ. d: VK1AC and Wx forecaster Keith Stibbs atop Macquarie Plateau.

W6KG/ex-DL4ZC ..Lloyd Colvin, 1636½ Berkeley Way, Berkeley 3, Calif.
West Gulf Bulletin Box 764, Austin, Tex.
West Gulf DX Club, Treasurer W5GSR, C. L. Kautz, 2024 Ross Ave., Dallas 1, Tex.
XW8AC .....Lucien, Box 87, Vientiane, Laos.
YA1AA .....Bob, Via ARRL.
ZD9AE .....Via S.A.R.L. (South Africa).
ZS2MI .....Marion Is. c/o Sec'y for Transport, Private Bag 193, Pretoria, U. of S.A.
4S7AM ..... Alex Scott, Box 985, Colombo, Ceylon.

Thanks to the West Gulf Bulletin, DL4ZC, TG9AD, VK3IB, W6HUR and W4IMI.

Chilean "Wace" Award Changes

Effective July 1st, 1956 changes were made in the CE areas as follows: Districts CE1 to CE7 will remain about the same. The prefix CE8 will apply to Chilean hams in the provinces of Magallanes and Tierra del Fuego. Chilean stations on the Antarctic continent will use the prefix CE9. CEØ remains as Easter Island. Amateurs outside of South America may obtain the WACE Award by submitting proof of contacts with 8 of the 10 CE call areas. QSL's are not necessary if a list of contacts is certified by a radio club affiliated with the I.A.R.U. Applications should go to CE3AG, Secretary, Radio Club of Chile, Casilla 761, Santiago, Chile.

Sicilian Award

The W.A.S.P. (Worked all Sicilian Provinces) Certificate is available to all stations who can submit proof of contact with five of the nine provinces of Sicily. Rules were modified on Januay 1st, 1956 to allow Phone/CW contacts. 4 IRC's should accompany QSL cards. The provinces are: Agrigento, Caltanissette, Catania, Enna, Messina, Palermo, Ragusa, Siracusa and Trapani. Applications go to IT1TAI, Box 300, Palermo, Sicily.

DX'ploits

Chas, W1FH, leads off this month with XE4A and YVØAA to reach 268! . . . Andy, W6ENV, is runner up with an imposing 266 thanks to YVØAA, XE4A and PJ2MC as Frank, W6SYG, rises to 263 with XE4A and YVØAA . . . Frank, W6AOA, went to 262 with the same as Walt, W6MX, nabbed SVØWN and XE4A for 261 . . . Al, W8PQQ, is also up there with 261 with YVØAA and XE4A while Howie, W2AGW, hits 260 with same . . . Lindy, W8BHW, also nipped YVØAA and XE4A for 253 and worked ZK1BS for his No. 156 on 21 . . . Ozzie, W9VND, goes to 253 thanks to YVØAA as Dewey, W6VE, made it 250 with I5RAM and PJ2MC . . . Horace, W6TI, emerged with 243 after snagging CR1ØAA, PJ2MC and I1DCO/M1 while Van, W9HUZ, also rested on 243 after keying with UD6BM, UN1AA, XE4A and YVØAA . . . Clint, W8SYC, nipped VR1B, SVØWN, PJ2MC and YVØAA for a 238 total as Hal, W6NNV, adds AC5PN, YVØAA, PJ2MC and XE4A for 233 . . . Bert, G8IG, goes to 220, CW, and 194, phone, with VP1NS while Burt, W6EHV, hits 220 with PJ2MC and CEØAD . . . Murel, W8SRD, submits additions jumping him from 186 to 213 as Hal, W6JK, adds such as YVØAA, ZS2MI, ZD9AE, UR2KAA, XE4A and EA9DF to reach an even 200 . . . Joe, W7ASG, submits new list putting him on 192 while Clay, W6LGD, reaches 191 with XE4A, YVØAA and ON4FU/LX . . . Dan, W6PH, upped to 190 with HI8FR, CEØAC, XE4A, VR1B and YVØAA as Vaughn, W6ID, hits 185, thanks to PJ2MC and HI8FR . . . Jack, W6BUY, besides walking away with a KWS-1 at the convention added FS7RT, PJ2MC, YVØAA, ZD9AE, EA9DF and XE4A for 162 while Geb, W6AOD, nabbed YI2AM, VR3B, 9S4AX, MP4QAL and ET3LF to rest on 156 . . . Doug, W9FDX, goes to 208 with UA9DN, VK1IJ, MiB, VR6AC, XE4A and UC2AA as Glenn, W7ADS, moves to 197 with IS1BV, UA9YF, TG9AD and EA6AR . . . Bill, W5ASG, has worked 167 countries this year and his QSO with XE4A gave him 260 on CW and 191 on A3 . . . Dick, KV4AA, moves to 258 with YVØAA and XE4A while Art, W9LNM, reaches 247 with XE4A, YVØAA, PJ2MC and UO5AA . . . Weldon, W2NSZ, also keyed with XE4A and YVØAA for 243 and Howie, W2QHH, goes to 243 with the



Should an OM/XYL DXCC come into being this combo would have 317 countries. We refer to Clay, W6LGD, with 191 and Aleta, K6ENL, with 126. Habitat: Fair Oaks, Calif.



Matty, PJ2AW, Aruba, NWI, is staging a long recovery from polio. He is heard on 14050 and 14080 CW. A GLOBE SCOUT and SX43 (belonging to PJ2AO) are used.

Jack, W8EKK, runs 500 watts and his DX is in the 160's. Jack does not have the use of his arms and keys by blowing into the mike. We sincerely hope a contemplated operation will benefit his condition.



same two plus PJ2MC . . . Joe, W8UAS, is 235 with PJ2MC as Gus, W2HMJ, rose to 230 with PJ2MC and YJ1RF . . . Chuck, W4LVV, hits 225 with XE4A, UN1AA, YVØAA and PJ2MC while Buzz, W9ABA, upped to 223 with CR1ØAA, UJ8AJ, UN1AA, XE4A, YVØAA and UD6KAB . . . Ev, KP4KD, is heard from again reporting VR1B and YVØAA for a 214 total as Carl, W1ZL, goes to 214 with LU3ZY, FS7RT and VR1B . . . Eric, OZ7BG, rises to 213 with PJ2MC while Buck, W4RBQ, also hits 213 with XE4A . . . Bob, W1FKV, snagged JP2MC, XE4A and YVØAA for 212 while Walt, VE3AAZ, slid to 199 with ZA1BB, ZK1AB, ZD6RM, VR1B, EA9DF and HKØAI . . . Paul, K2GFQ, climbs to 198 with JZØPS, XE4A, YVØAA, VQ8CB, PJ2MC, FG7XC, FE8AE and UD6BM as Lee, W8CED, goes to 192 with VR3B, UQ2AS, UC2AA, XE4A, KB6BA, UG6AL, UP2KBC, YVØAA, ZD6JL, PJ2MC, I1DCO/M1 and UI8KAA . . . Rip, W4EPA, adds CR5SP, PJ2MC and I1DCO/M1 for 195 while John, W4HA, hits 218, CW, and 205, phone with LZ1VK, OY2A, YJ1AA, 9S4AX, M1B, FB8ZZ, EA6AR, FK8AO, FU8AC and VR1B . . . Mickey, W8YIN, is 205 with VQ8CB, UQ2AS, UA9DA, XE4A, YVØAA and I1DCO/M1 as Bayard, W3AYS, latched on to KJ6BN, VR1B, AP2M, FK8AO and FS7RT for a 178 total . . . Paul, W9KXK, enters new list giving him 168 while Ed, W6UQQ, hooked YI2AM, VQ3CF, XE4A, ZD9AE and UC2KAB for 159 . . . George, W1DEP, came up with YVØAA, VK9WP, VS1GZ and FS7RT for 184 as Mel, W5AWT, made it 149 thanks to 26 additions . . . Aleta, K6ENL, moves to 126 with her addition of VQ3CF, XE4A, ON4QX/LX, ZD9AE, UC2KAB, CN8AF and YVØAA while in the "phone only" column, Robbie, VQ4ERR, hits 241 with such as VR6AC, 3W8AK, KM6AX, LU2ZY, ZD8SC, VP5RR, PJ2MC, YVØAA and FS7RT . . . Willard, W1NWO, miked with FU8AC for 219 as Bill, W4ESP, ran his phone total to 191 with LZ1KDP, FY7YE, ZD8SC, 9S4BN and XE4A . . .

Flash

With the arrival of a UAØKFD QSL, Jayme, PY2CK, becomes PHONE WAZ No. 3 (No. 324) wit ha 244 mike total. Congrats!

Lloyd, DL4ZC, and XYL, DL4ZB, wind up a three year stint at DL4 and QSY to W6KG. 199 countries were worked and WAZ plus WAE-1 made but not confirmed. The following certificates were garnered: WAE-III, WAE-II, WASM-1, WASM-2, DUF-1/2/3/4, DPF, CDM, H-22, WAC, WAS, AJD, DXCC, WAYUR, OHA, AAA, DIPLOMA ESPANA, WDT and WAV! QRT occurred on July 7th . . . Don, W4ERJ, passed Mach I with VP8BK, HI8FR, VR1B, ZC4TB, OD5LX, KJ6BN, KB6BA, ZB2T, 9S4AX, VK9DB, KW6CA, UB5KBE, UA6UI, UR2KAA and VQ2GR for 101 . . . Chas, K2END, completed WAC and moved to 48 with such as 9S4AX, SP8CK, 4X4BT, OY7ML, YO2KAB, HA5BU, ZD4BQ, HH7YL, VQ4EO and KH6WW . . . Bill, K6BFC, cracked the 100 barrier and moved to 106 with such as VU2AL, FB8ZZ, ZK1BS, VP8BS, VP8BK, KJ6BN, VP7NZ and LU3ZY . . . Larry, W9CLH, made it 49 with VP4LF on 7 CW while Brice, W9PNE, hits 131 with VR1B, VK9XK, FK8AE, KJ6BN, CR7LU, 3V8AN and YO3FT . . . KV4AA was No. 98 for VQ4FI.

ACTIVE RUSSIANS HEARD OR WORKED
TIME GMT, QRG 14 MCS (LESS UA1/6, UB5)

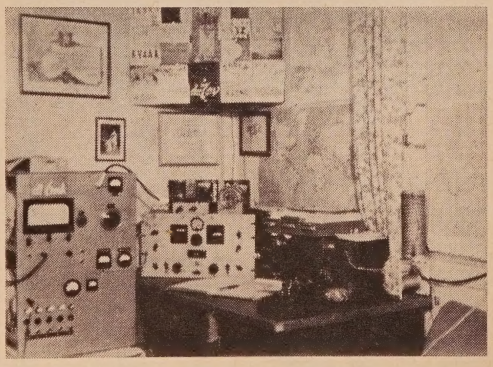
UC2AA	Zone	16	080	2345
UC2AE		16	080	2345
UC2KAB		16	032	2204
UC2KAC		16	045	1505
UD6AL		21	080	0253
UD6KAB		21	022	0015
UF6AM		21	040	1400
UF6FB		21	060	2239
UG6AG		21	029	0400
UG6KAA		21	070	0100
UH8KAA		17	077	1415
UI8KAA		17	040	1217
UJ8AF		17	047	0155
UL7AB		17	077	2350
UL7KBK		17	025	1318
UN1AA		16	056	0415
UN1KAA		16	060	0600
UO5AA		16	030	0340
UO5KAA		16	007	0030
UP2KBC		15	VFO	0318
UQ2AH		15	074	0407
UQ2AN		15	125	0432
UK2AS		15	043	0520
UR2AK		15	080	0100
UR2KAA		15	067	1620
UA9CF		17	060	0203
UA9CM		17	096	1840
UA9DH		17	078	1433
UA9DN		17	082	1848
UA9MI		17	054	0137
UA9VA		18	095	1530
UA9VB		18	063	1410
UA9YF		18	004	1442
UA9YE		18	030	1400
UA9KKC		17	070	1451
UA9KYB		18	050	1310
UAØAG		18	095	1512
UAØCD		18	040	1338
UAØCE		18	065	2245
UAØOM		18	030	1340
UAØSJ		18	050	1533
UAØSK		18	008	1440
UAØKBA		18	070	1345
UAØKCA		19	092	1605
UAØKJA		19	039	1410
UAØKFC		19	040	1333
UAØKOA		18	075	1208
UAØKQB		19	051	1756
UAØKUA			062	1405
UA1KAE		13	050	1130
				(Antarctica)

Here and There

W7EJD spent 3 hours with Dave, YJ1DL, and XYL on June 26th. They were on their way to Anchorage, Alaska, where Dave has a sister. He has some cards from his operation at FO8AB which will be mailed from Alaska. Lots of luck, Dave! . . . KV4AA would like QSO sked with ZD1DR and G3PU seeks a QSL from the W op at TA3FAS, 1950-51, which would give him WAC on 160 meters—how? . . . New West Gulf DX Club officers are: Pres. W5FXN, V.P. W5ADZ, Sec'y./Treas. W5GSR, Policy Committee W5ALA, W5BNO, W5CEW, W5KC and W5VU . . . We regret to report the passing of G5PS. Hamish succumbed to a heart attack on June 5th . . . The British FCC recently acquired its 500th member, ZS3Q . . . New officers of the Mike and Key Club, KA2NY, are: Pres. W7ZZI/KA2RK, V.P. W4RYI/KA2NY, Sec'y./Treas. K6LTL/KA2LL, QSL Mgr. W7FHL/KA2MP and SCM Reporter W7ANH/KA2IE . . . W6RW won a 75A4 at the SF Convention—nice going! . . . It was our misfortune to hear a definitely unbalanced character signing ZA1A and then switching to various other calls, such as ACØZZ, VQ7X and CR2AB, after each call. The session wound up with various W's suggesting all sorts of calls to use. We can only hope that this knot-head is eventually nabbed and has the book thrown at him! . . . W6NIF/4 pulls the big switch and returns to W6-land in August . . . On his trip from Canton to Nauru Danny lost a life jacket bearing the name of the YASME. If this is picked up we would like to assure the finders that Danny is safe and sound and going strong . . . VS1EW will be driving from New York to California this fall. His car will carry his call sign . . . G4QD visits the states from July 9th to August 9th . . . VL6LQ arrives in NY last of August. He will stay for a month and then be in Cleveland for two weeks and then to Houston for two weeks. Visit to W6 is possible if dollars hold out. He leaves USA last of November and will be on again from VQ6 early in December . . . KV4AA was happy to log visit by Joyce, K2CFF . . . Pat Miller, W2AIS, SS PIONEER COVE, has been heard from many VK ports. He advises that W stations may obtain permits for such operation by applying for same to: Postmaster General's Dept., Treasury Gardens, Melbourne, C2, Victoria, Australia. Permit is good for one voyage but may be renewed. No third party traffic is allowed.

Last Minute Items

New address of the Swiss QSL Bureau is: U.S.K.A., Knutwil, Switzerland. . . Requests for missing CR6 cards may be made to the Angola QSL bureau, CR6CW, write to: Liga Dos Amadores de Radio de Angola, Caixa Postal 484, Luanda, Angola. . . CE3AG reports UA1KAE, on 14060, giving QTH as "South Pole". . . The Luxembourg expedition by Messrs. ON4CC, ON4DE, ON4FU, ON4LJ, ON4RB, ON4TQ, ON4QX and ON1678, June 9th and 10th, resulted in 428 contacts on CW. Only four contacts were made in phone. . . The annual meeting, and dinner, for W9-DXCC members will be held at the Sheraton Hotel, Chicago, on September 8th. For further details contact W9-DXCC Club President, W9EU. . . KV4AA has been receiving some QSL's for a station signing PX1AR/SV who claims to be on the Dodecanese Islands and who was active around June 19th. We no know! . . . From Beda, OK1MB, who now seems to be his old self again and who has assumed the job of "DX Mgr." in OK-land, we hear that there is a ZE ham in VQ9 who is QRX for his license which is a little hard to come by. Beda also reports that YA1RF has been heard on 14080 at 2000 GMT, name Paul, runs 25 watts. PX1EX will soon be on again from Andorra in an expedition similar to the one of last year. LB8YB/P should be active from Spitzbergen starting around mid-August. . . YVØAA QRT'ed on June 25th after a very successful operation. . . Art Collins, WØCXX, participated in another test flight, June 29th/July 7th, on the following route: Offutt AFB to Griffis AFB (NY) to Mitchell AFB (NY) to Portsmouth AFB (NH) to Loring AFB (Me.) to Harmon AFB (N'f'land) to Goose Bay Lab. to Thule to Pt. Barrow Alaska, to Nak Nak, King Salmon, Alaska to Anchorage Alaska to Travis AFB (Calif.) and back to Offutt AFB. Skeds were due to have been maintained on SSB and CW with W7BA, W6ITH, K6EB, W5ZO, KØAIR, KØEXI, WØCXX and W2GU. . . . SVØWN (Crete) has been on the air infrequently due to his inability to get parts to put his own rig on the air and to the difficulty of getting permission to operate the station (gov't) on the ham bands (via W2QHH). . . With the advent of USSR ham activity DL7AA advises that the substitute country list for the WAE Certificate is abolished as of June 1st, 1956. QSL's from substituting countries may be submitted until May 31st, 1957 which cover contacts with same from the period December 31st, 1951 to May 31st, 1956. . . DL7AH tells us that the AC5PN, heard around 2000 GMT, is a phoney



Operating position of DL6MK, Edgar Schnell, Bamberg, Germany, is shown above. Ed runs 250 watts to a pair of RL12P35's and is a recent entry to CQ's HONOR ROLL with a DX total of 39-160.

TURKS ISLAND activity has been ably taken care of by this group who are, standing l to r: VP5DC/W4NMO, VP5GB/WØOUZ, VP5FH/W6NHX. Sitting, l to r: VP5BE/W8QLF, VP5RR/W5HVV and VP5MS/ex-K4DJL. At present only three are active on Turks, VP5FH, VP5RR and VP5MS, mostly on 14 and 21 phone. VP5BE is now stationed on Nantucket Island with the Navy while VP5GB and VP5DC are both in the Dominican Republic and doing their utmost to get HI tickets. QSL's for VP5MS should go via WØBTX.



in DL3-land. . . KW6CD is on the air frequently, 0600 to 1100 GMT, CW and phone, looking for Caribbean countries. . . W6KTE and W6UWL should now be on with KA calls. . . Between August 6th and 20th W2EQS hopes to be on with an FP8 call. . . KV4AA logged a very pleasant visit from Bob, W8PMA. . . VR1B, Danny, pulled the big switch on his three month British Phoenix operation and departed for Nauru Island (VK9TW) on June 30th. He should have been heard from there around July 20th. . . Many ZA's have been reported ie: ZA3MK, ZA1UB, ZA1UU, ZA2CS but we haven't been able, as yet, to pin one down as an honest "cross-your-heart" good one! . . . VP7BB (W4SON) says he will make Navassa, KC4A-, try. Action from Navassa is also a possibility as per Gary, W6NJU. . . . W8DED shipped 1000 QSL's to VS9AS who will return to home station, G3ANK, on July 22nd and QSL from there. . . W4CEN reports possibility of activity from Rodriguez Island, 350 miles east of Mauritius, from a ham friend of VQ8AG. This spot should be OK for a "new" one. . . . FY7YE QSL's go via W5JLU. . . . OY7ML advises that he is on every day at 0730 GMT, 14050 kc., sked can be arranged via DL7AH. . . . UAØKOA is reported in Tannu Tuva. . . . Plan for an expedition to Spitzbergen, by LA4DD and an ex-W4 in Norway, has been delayed by inability to get leave. Another attempt will be made next Spring.

73, Dick, KV4AA

Honor Roll

(To July 15th, 1956)

Last complete HONOR ROLL appeared in the Aug. issue. Next HONOR ROLL will appear in the January issue.

WAZ CW/PHONE	
W1FH	268
W6ENV	266
W6SYG	263
W6AM	262
W6AOA	262
W6VFR	261
W9NDA	261
W8PQQ	261
W6MX	261
W2AGW	260
W6MEK	259
W8KIA	258
PY2CK	257
G6ZO	256
W5KUC	256
W3GHD	255
W6DZZ	255
W7AMX	255
W6SN	255
W3JNN	255
W8JIN	255
W3KT	253
W3EVW	253
W8BHW	253
W9VND	253
WØYXO	252
W6ADP	252
W8HGW	251
W8BRA	251
ZL2GX	251
W6SAI	251
W2BXA	250
W6VE	250
W8NBK	249
W6TS	248
W6EBG	248
G6RH	247
W3BES	246
VE4RO	244
W9HUZ	243
W6TI	243
CE3AG	243
W9FID	241
W7GUV	241
W3JTC	240
W1GKK	240
W3GAU	239
W6GDJ	239
W7RD	239
W5KC	239
W8SYC	238
W6NNV	238
W6GRL	237
F8BS	236
W3CPV	235
LU6DJX	234
WØELA	234
W6BUD	234
W6AMA	233
SM5LL	233
VK2ACX	233
G2LB	232
G4CP	232
W7DL	232
W6UHA	232
W6SRF	232
W6FFM	231
W9FKC	231
W6DLY	231
W6SR	231
CE3DZ	231
W7GUI	229
HB9J	228
W7HXG	227
WØDU	227
W6PFD	226
W7GBW	226
WØPNQ	224
W6NTR	224
DL1FF	223
VK3BZ	223
DE1ER	223
ZL1BY	223
W8WZ	223
W3LOE	222
W6FSJ	222
W3BHV	222
W6MVQ	221
W6PB	221
G6QB	221
W8TTS	221
SM5KP	220
W6CYI	220
W6EPZ	220
W6EHV	220
G8IG	220
W6ITA	219
W6TT	218
WØNUC	218
W6PQT	218
G2PL	218
KH6IJ	218
W6PKO	218
W6LDD	218
WØDUY	217
W6DI	217
ØK1FF	216
W2PEO	215
W8IYE	214
PY1DM	214
ZS2X	214
KH6BA	214
W6CEG	213
W4AIT	213
KH6CT	213
VK4HR	213
W6RBQ	213
PY1AHL	213
W6LN	213
W6LRU	213
W8SDR	213
W6HX	212
VE7HC	212
W5GEL	212
W6RPD	210
W6MJB	210
W6IBD	210
G3DO	210
WØVW	209
W6RW	209
W2AQW	208
ZL1HY	208
W6RLN	208
W6SC	207
VK3KB	207
G4MJ	207
VE7VM	206
W4RPD	206
W6ERI	205
W6NGA	205
W6ZCY	204
VK2DI	204
W6AVM	204
DL7AA	204
W7ENW	204
W4CYU	203
W6HJT	203
LU8EN	203
W6ITM	202
WØOMC	202
G2MI	202
W8IW	201
W6RVM	201
WØKOK	200
VK3JS	200
W7OY	200
W8MHB	200
ON4QF	200
W6JK	200
PY1GJ	199
W6UCX	198
W2IOP	197
KH6QH	197
W6RAX	197
W6BAM	197
PY1AJ	196
W6WB	196
G2FSR	196
IIKN	196
ZS2AT	195
W6GAL	193
WØSQO	192
W6WWQ	192
W7ASG	192
VK2NS	191
W6LGD	191
W6SRU	190
W6PH	190
VK3JE	189
ON4JW	189
W9YNB	189
WØNTA	188
VK6RU	186
W6OFY	186
W4CYY	186
W2CZO	185
W1AB	185
W6IFW	185
W6ID	185
W6SA	184
KH6VP	184
W8PCS	184
W2JVU	183
DL1IB	183
LA7Y	182
VK4EL	182
SM7QY	182
PY1BG	179
W6BUO	179
W6ATO	178
WØOUX	177
VE6KW	177
W6UZX	177
CX1FV	176
K1CQD	176
PK4DA	175
W8HUD	175
W6WKU	174
W6CIS	174
W7EZA	174
W6KUT	174
W6TZD	173
G5VV	172
OK1MM	172
G3AAE	172
OK1HI	171
DL1AB	170
W6PZ	170
W5AFX	169
G2VD	169
W6CTL	169
W6JZP	168
W6ANN	167
VK3CN	167
IIXK	167
W6DUC	166
KH6MI	166
W6CEM	166
VE7GI	165
W6BZE	165
ZS6A	164
W6BIL	164
W6FAK	163
W6YZU	163
G5GK	163
VE7VO	162
ZS6DW	162
IIIR	162
W6BUY	162
W6PDB	161
OK1SV	160
VE3EK	160
W6PUY	160
JA2KG	160
KH6MG	160
W6ONZ	160
OH5NK	159
WØFFV	158
WØOUH	157
G3TK	157
W6QD	157
ZS6FN	157
W7BE	156
W6AOD	156
KH6IG	156
DL1DC	155
VK5KO	155
G3AAM	154
G2IO	154
W6ELQ	154
W6KEV	153
OK1RW	153
W6FHW	153
G3YF	152
KP6AA	152
VK2QL	151
VK2AM	151
W6LEE	150
W6FHE	150
W6EYR	150
W6LER	150
W6NZ	147
OK1CX	147
W6LS	147
W7KWC	147
KH6PY	147
W7DXZ	146
W6AYX	146
W6GD	146
VS6AE	146
W9NRB	145
W6MUC	145
OK2SO	145
ON4TA	144
G3BI	144
W7LYL	143
KG6GD	143
W3IXN	141
VK2PV	140
OK1WX	135
W7BTH	135
G3AZ	133
W6TEU	133
W6RDR	133
W6AUT	133
VE7KC	133
W6OBD	131
ZS2CR	131
CR4AN	131
W6IDZ	130
G8IP	127
G5BJ	126
VK6SA	126
PK6HA	124
G5VU	124
W6NRQ	123
W6MLY	123
ZL1GX	122
VK5MF	121
ZL2CU	120
ZS2EC	116
ZS6CT	113
W6DVB	104
K6RAL	103
W7KWA	98
W7IYA	59

39 ZONES	
W5ASG	260
KV4AA	258
W2WZ	248
W9UNM	247
W1CLX	246
W3FPV	243
W9RBI	243
W2NSZ	243
W1BIH	242

[*Continued on page 115*]

RTTY tones, 2125 cycles for *mark* and 2975 cycles for *space,* should be reasonably accurate as many RTTY stations use the same a-f converter for AFSK as well as FSK. Consequently, the station you are working *may* have a pretty sharp converter. Tone standards among RTTYers are not too plentiful, unfortunately, probably due to the difficulty of accurately calibrating them. This has been a problem to RTTYers for many years.

Bob Witschen, WØSV in St. Cloud, Minnesota, has come up with an entirely different solution to that problem. He has worked out, and built, a simple but accurate tone generator by rotating gears with a synchronous motor and mounting a single earphone 1/64" from the gear teeth as a magnetic pickup. As shown in the sketch, the actual tone generator is an 85-tooth gear rotating at 1500 or 2100 rpm past the headphone. The above countershaft speeds are arrived at by gearing to an 1800 rpm synchronous motor. The driven gear on the countershaft has 60 teeth. The motor shaft has two gears, one with 50 teeth and the other with 70 teeth. Speed shifting is done by moving the driven assembly to mesh with the 50-tooth gear to get 1500 rpm (2125 cycles) or the 70-tooth gear to get 2100 rpm (2975 cycles).

Now for the details: The gears are listed in catalog #55 of the Boston Gear Works, 480 Canal St., New York, N. Y. The drive gears and the driven gears are 20-pitch, ⅜" face, ⅜" hole, with hub. The tone gear, known as a "changegear," is 16-pitch, ½" face, ¼" hole, no hub. Both drive gears were fitted to the shaft of a 1/5 hp GE capacitor-type "1725 rpm" refrigerator motor which was changed to an 1800 rpm synchronous motor by filing four flats on the rotor. The shaft was turned down to ⅜" and was left a little longer than usual to permit mounting both gears. Bob adds that a regular *Teletype* synchronous motor would work, ". . . as is."

AMATEUR RADIOTELETYPE CHANNELS

National, FSK 3620, 7140, 27,200, 29,160, 52,600 kc.

National, AFSK 27.2, 147.96, 144. 138 Mc.

Area Nets:

California 147.85 Mc. AFSK on AM

Chicago 147.7 Mc. AFSK on FM

Detroit 147.3 Mc. AFSK on FM

Washington, D. C. 147.96 Mc. AFSK on AM; 147.495 Mc. AFSK on AM

New York City 147.96 Mc. AFSK on AM

Buffalo/Niagara 147.5 Mc. AFSK (space) on AM

Boston 147.96 Mc. AFSK on AM

RTTY

Byron H. Kretzman, W2JTP

9620 160th Ave., Howard Beach 14, N. Y.



Amateur Radio W3KYR, Boy's Club of St. Mary's, Inc., St. Mary's, Pennsylvania

Other gear combinations may be used. For example, a 1500 rpm shaft with an 85-tooth gear and a 119-tooth gear will give the 2125 and 2975 cycles directly to two magnetic pickups. Gears with the above number of teeth are available at several gear supply houses, according to WØSV.

Accuracy of this kind of tone generator depends primarily on the accuracy of the 60-cycle power line frequency, which is usually pretty good. If you are an inquisitive soul, you can check this by comparing an electric clock that has a sweep-second hand with the one-second pulses of WWV.

Last month we gave you the low-down on equip-

ment for punched tape operation. This month we are continuing the tape story with the dope on the more plentiful of the narrow-tape or "strip" printers.

RTTY Principles & Practice

Part 2-d—Tape Equipment, *continued.*

Quite a few *WU* Model 21-A "midget" tape printers were made available a few years ago. The system used by the wire company local telegraph offices was to print incoming messages on narrow gummed paper tape. The tape was then cut up, moistened, and pasted directly on telegram forms for delivery.

The 21-A printers have no internal receiving distributor because they were operated in banks from a large, common, master distributor. Therefore, if you obtain a Model 21-A, you are going to have to provide an external distributor. Available to amateurs in the past have been the *Morkrum* distributor, previously described. Another possibility is the keyboard-distributor section of the Model 12. Since the advent of the quieter Model 26, many Model 12's have been resting on their laurels. Here is a good chance to put at least part (a quieter part) of this venerable old clank to use again. Since the 21-A is magnetically operated, it is a fairly quiet device in itself. The XYL won't mind autostart this way!

There is no motor in the 21-A. It is wholly an electrically-operated machine for receiving five-unit code combinations of impulses and translating them into printed characters. There is a type basket, somewhat like that in an ordinary typewriter. The proper selection of the type-bars is determined by the location of five selector bars which are controlled by five selecting magnets. These are wired to segments on the associated receiving distributor. As shown in the schematic diagram, *Fig. 1*, the sixth-pulse magnet is operated through a sixth-pulse relay and printing contacts. The printing solenoid, which does most of the work, is also operated by a relay and printing contacts. Not shown on the schematic is a "tape-out" buzzer which operates as the "tape-out" contacts close when you run out of tape. The buzzer is connected, in series with the "tape-out" contacts, to the d-c supply via terminals *12* and *16*.

Each type bar carries two characters, except for the spacing type bar which is not fitted with a type slug. To get to upper case for numerals, punctuation marks, etc., it is necessary to receive the "figures" character which operates selector magnets *1, 2, 4,* and *5*. The carriage frame and platen mechanism then shifts to and locks in the "figures" or upper case position. Reception of the "letters" character operates selector magnets *1, 2, 3, 4,* and *5;* and then returns the carriage frame and platen mechanism back to lower case. A knob attached to the platen shaft permits manual shifting and spacing. The bell is rung when the letter J character is received following the "figures" or upper case character. This is in contrast to upper case S on the Model 14, 15, and 26; and the "blank" character on the Model 12.

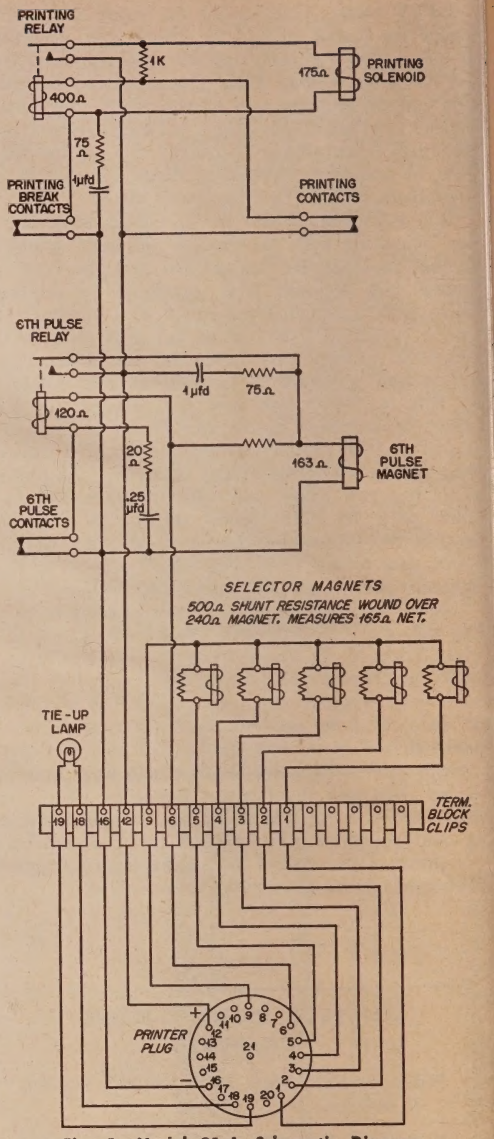
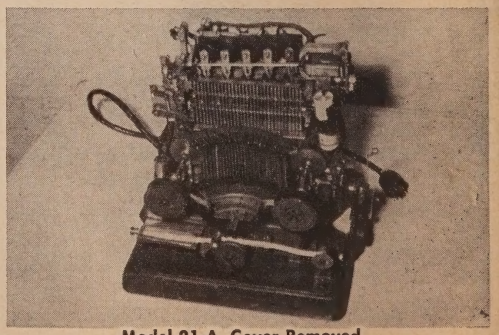


Fig. 1. Model 21-A Schematic Diagram



Model 21-A, Cover Removed

The ribbon can be a standard ½" *Underwood* typewriter ribbon. Automatic ribbon feeding and reversing is provided by metal reversing eyelets a short distance from each end of the ribbon. These catch on a reversing arm as the ribbon unwinds in much the same manner as in a typewriter.

Before attempting any complex adjustments, beg, borrow, or obtain through devious means, an adjustment manual, such as the WU #6115-A "Specifications for the Operation and Adjustment of Multiplex Printer 21-A." The unit should be thoroughly cleaned and examined before doing anything in the way of adjustment. A thin film of oil should be on all bearing surfaces, *except* on the solenoid plungers and type bars. The sixth-pulse and printing relay contacts should have about .005" clearance between the core and the armature when closed. When open, .012" should be measured between contacts. Avoid any type alignment at all costs. That is a job really for the experts.

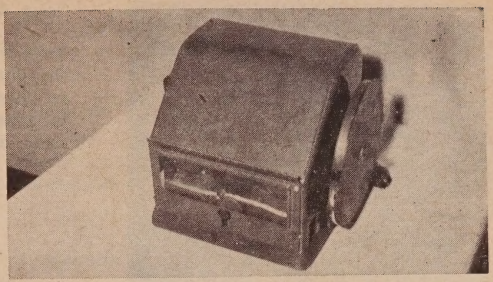
The Model 401-A Teleprinter is only a little larger than the 21-A, but it is completely self-contained. No external distributor is necessary. It is similar in many respects to the Model 26 page printer. It has a type wheel, but the type in this case is rubber, and the type is inked by a roller instead of a ribbon.

Important note: The 401-A operates on a *70* ma. d-c loop instead of the usual 60 ma. Also, polarization of the current must be correct or the selector magnet won't operate. While basically a "single-magnet" machine, it actually has two selector magnets already connected in series. See *Fig. 2* for the schematic diagram. The tape-roll holder is fitted with a set of "low-tape" contacts which close when most of the tape has run out. These contacts operate a buzzer mounted on the back of the tape-roll holder. Power for the buzzer is supplied from the a-c line through a pair of 850 ohm resistors. Usually, the 401-A is supplied with an a-c synchronous motor; however, some units could have been equipped with d-c motors.

Mechanically, the 401-A is a motor-driven teleprinter mechanism. Characters which can be printed are molded in rubber on the rim of a type wheel. Like the 21-A, printing is done on narrow gummed paper tape, but instead of using a ribbon, the tape is pressed against the characters on the type wheel which is inked by a saturated roller. Two rows of characters are provided, one for "letters" characters and the other for "figures" characters. Also, like the 21-A, the bell function is operated by the letter J preceded by "figures."

Here again it is recommended that the service manual be obtained before making any adjustments. The manual is *WU*, "Specifications #8684-A, Teleprinter 401-A Operation and Maintenance." General maintenance consists of wiping off excess oil and ink thrown, and removing paper dust. Lubrication, when required, consists of oiling with a light automobile oil all shaft bearings and the felts in the friction clutches. Be careful to keep oil away from the rubber type. Motor bearings

Model 21-A Narrow-Tape Printer

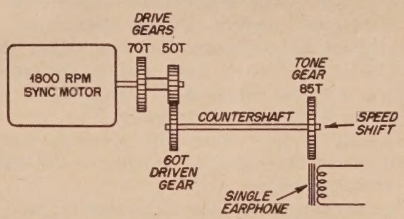


and gears will require greasing less frequently, using "A-29 non-fluid oil" made by the N. Y. & N. J. Lubricant Company.

The ink used to ink the roller is *WU* #56. Company maintenance routine required the installation of another inked roller every month. This, naturally, wouldn't be necessary in the normal amateur RTTY station. When inking is required, remove the roller and apply ink *sparingly*. Don't do this in your living room, and wear old clothes. The stuff really stains.

Behind the selector cam friction clutch is the orientation scale. While receiving the "quick brown fox" from a tape transmitter on local loop, move the scale toward zero until errors appear, then move it back slowly until the errors disap-

[*Continued on page 100*]



2125 & 2975 cycle Audio Tone Generator

PARTS LIST

Drive Gears—50 teeth 2.5" Dia. Cat. #NA-50, pg 48. List $2.30
70 teeth 3.5" Dia. Cat. #NA-70, pg 48. List $2.70

Driven Gear—60 teeth 3.0" Dia. Cat. #NA-60, pg 48. List $2.50

Tone Gear (change-gear) 85 teeth 5.5" Dia. Cat. #GB-85, pg 55. List $3.95.

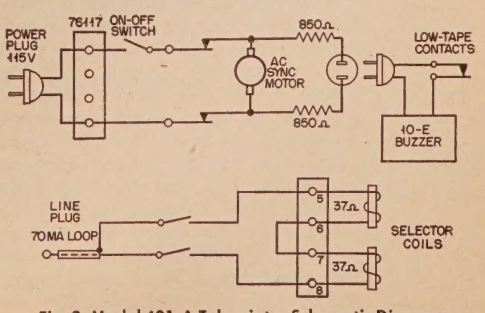


Fig. 2. Model 401-A Teleprinter Schematic Diagrom

PROPAGATION

George Jacobs, W3ASK/W2PAJ
607 Beacon Road
Silver Spring, Md.

Last Minute Forecast for September

There is a tendency for short wave radio disturbances to increase considerably during equinoctial period. The fall equinox occurs on September 21 and propagation condition during the period of September 15-22 are expected to be unstable. A moderate radio storm is also forecast for September 5-6.

During the month of September the seasonal transition between summer and winter shortwave propagation conditions generally begins. During the fall and winter months in the Northern Hemisphere, higher frequencies become more usable in the daytime, resulting in more frequent openings of the ten, fifteen and possibly six-meter amateur bands. Atmospheric noise (static) and ionospheric absorption decrease considerably on most circuits during the fall and winter months, and as a result most signals are usually stronger and signal to noise ratios considerably higher than during the summer months. On the other hand, with more hours of darkness, the night-time usable frequencies are lower than during the summer months, with the fifteen and twenty-meter bands fading out earlier than previously. The occurrence of Sporadic-E type short-skip openings also decrease considerably during September and the fall and winter months.

The following is an over-all picture of band conditions forecast for September, 1956, with a brief discussion of the qualitative changes in each amateur high frequency band from month to month. For specific times of band openings for a particular DX or Short-Skip circuit, refer to the *CQ Propagation Charts* on the opposite page.

6 Meters: With good indications that exceptionally high sunspot activity may occur this fall and winter, six-meter skywave propagation may be better than ever before. While conditions on this band are not expected to peak until the winter months, the band is expected to begin to open during September on circuits to South America. Optimum times for these circuits to open are during the afternoon and early evening hours. In other parts of the world, where the degree of ionization of the reflecting layers are greater than over the USA, a considerable number of six-meter openings are likely to occur during September. For example, on circuits between Hawaii and the Far East the *maximum usable frequency*, or MUF, approaches 50 Mcs between 0100 to 0500 GMT and on circuits between California and Hawaii and some of the Pacific Islands further west, the MUF will probably rise above 50 Mcs on some days of the month during the period 2 PM to 5 PM *Pacific Standard Time*.

10 Meters: World-wide openings are expected on many days of the month from shortly after dawn until early evening, with considerably more openings than occurred during the summer months. Short-skip openings, between approximately 1000 and 2400 miles should also occur during the daytime hours of most days during September. Because of low ionospheric absorption in this frequency range, signals are expected to be exceptionally strong even with relatively low power transmitters.

15 Meters: Exceptionally good world-wide DX should be possible almost daily from shortly after sunrise, to considerably after sunset, *local standard time*. On days when propagation conditions are above normal, the band may remain open to South America and other parts of the world until after midnight. Propagation conditions on fifteen-meters are optimum during the late afternoon and early evening hours. During this period, fifteen-meters may be the best DX band with signals from all Continents coming through at approximately the same time. Good regular layer short-skip propagation, between approximately 1000 and 2400 miles, is also likely to occur almost daily during the afternoon hours. Static levels and ionospheric absorption are relatively low on fifteen-meters, and signals will generally be quite strong, especially during the afternoon and early evening hours.

20 Meters: Exceptionally good DX propagation conditions are expected to occur around the clock on most days during September. Conditions will be optimum during the late afternoon and early evening hours, with the peak

ALL TIMES IN EST

EASTERN USA TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Western Europe	7A-9A (1) 9A-2P (3) 2P-4P (2)	5A-8A (3) 8A-2P (2) 2P-4P (4) 4P-7P (2)	4A-7A (2) 7A-2P (1) 2P-8P (4) 8P-11P (2) 11P-4A (1)	5P-7P (1) 7P-2A (3) 7P-12M (2)*
Southern Europe & North Africa	6A-8A (1) 8A-10A (3) 10A-2P (4) 2P-5P (2)	5A-7A (3) 7A-1P (2) 1P-5P (4) 5P-8P (2)	7A-12N (1) 12N-3P (2) 3P-8P (4) 8P-11P (3) 11P-7A (2)	6P-8P (2) 8P-12M (3) 12M-2A (2) 7P-12M (2)*
Near & Middle East	6A-8A (1) 8A-12N (2) 12N-2P (1)	5A-8A (2) 11A-3P (2)	12N-3P (1) 3P-5P (2) 5P-11P (3)	6P-11P (2) 8P-10P (1)*
Central & South Africa	8A-10A (1) 10A-2P (2) 2P-5P (4) 5P-7P (1)	12M-5A (1) 12N-3P (2) 3P-6P (4) 6P-12M (2)	2P-6P (2) 6P-9P (4) 9P-1A (3)	6P-11P (2) 7P-10P (1)*
South America	1P-6P (1)** 5A-10A (3) 10A-2P (2) 2P-6P (4) 6P-8P (2)	5A-9A (3) 9A-3P (2) 3P-8P (4) 8P-11P (3) 11P-2A (2)	1A-6A (3) 6A-8A (2) 3P-7P (3) 7P-1A (4)	8P-3A (3) 3A-6A (2) 9P-3A (1)*
South East Asia	4P-7P (1)	8A-11A (1) 4P-8P (2)	6A-9A (1) 8P-2A (2)	NIL
Australasia	9A-11A (1) 4P-7P (3) 7P-9P (1)	8A-10A (3) 10A-12N (1) 3P-6P (1) 6P-9P (3) 9P-11P (1)	1A-6A (1) 6A-9A (3) 9A-11A (1) 8P-11P (2) 11P-1A (3)	3A-4A (2) 4A-6A (3) 6A-8A (2) 4A-6A (1)*
Guam & Pacific	3P-5P (2) 5P-7P (1)	9A-11A (1) 3P-5P (2) 5P-9P (3)	6A-8A (1) 6P-9P (1) 9P-2A (2)	10P-3A (1)
Japan & Far East	4P-7P (2)	7A-9A (1) 3P-5P (2) 5P-8P (3)	6A-9A (3) 4P-6P (2) 6P-8P (3) 8P-1A (2) 1A-3A (1)	NIL

ALL TIMES IN CST

CENTRAL USA TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Western Europe	8A-10A (1) 10A-1P (3) 1P-3P (1)	6A-10A (2) 10A-1P (1) 1P-3P (3) 3P-5P (2)	5A-7A (2) 7A-3P (1) 3P-7P (3) 7P-2A (1)	6P-12M (3) 8P-12M (1)*
Southern Europe & North Africa	7A-9A (1) 9A-11A (2) 11A-2P (3) 2P-3P (1)	5A-7A (2) 7A-12N (1) 12N-3P (4) 3P-6P (2)	3A-6A (1) 12N-2P (1) 2P-4P (3) 4P-7P (4) 7P-11P (2)	6P-12M (3) 8P-12M (1)*
Central & South Africa	8A-10A (1) 10A-2P (2) 2P-4P (4) 4P-6P (1)	12N-2P (2) 2P-5P (4) 5P-11P (2) 11P-4A (1)	2P-6P (2) 6P-8P (4) 8P-12M (3)	6P-10P (2) 7P-9P (1)*
Central America & Northern South America	6A-11A (3) 11A-4P (4) 4P-6P (3)	5A-9A (3) 9A-2P (2) 2P-6P (4) 6P-12M (3)	8A-4P (2) 4P-11P (4) 11P-8A (3)	5P-8P (2) 8P-2A (4) 2A-6A (2) 7P-3A (3)*
South America	1P-6P ** 5A-11A (3) 11A-2P (2) 2P-5P (4) 5P-7P (2)	1A-5A (2) 5A-9A (3) 9A-2P (1) 2P-8P (4) 8P-1A (3)	2A-5A (3) 5A-8A (2) 3P-7P (3) 7P-2A (4)	7P-2A (3) 2A-5A (2) 8P-2A (2)*
Japan & Far East	3P-7P (2)	6A-9A (1) 1P-3P (2) 3P-7P (3) 7P-9P (2)	6A-9A (3) 2P-4P (2) 4P-10P (3) 10P-2A (2)	12M-6A (1)
South East Asia	2P-8P (2)	8A-11A (1) 3P-8P (2)	6A-9A (1) 5P-7P (1) 7P-1A (2)	NIL
Hawaii	11A-2P (2) 2P-7P (4) 7P-9P (3)	10A-2P (3) 2P-9P (4) 9P-11P (3) 11P-2A (1)	10A-4P (1) 4P-8P (2) 8P-2A (4) 2A-6A (2)	1A-7A (3) 2A-6A (2)*
Australasia	2P-4P (1) 4P-7P (3) 7P-9P (2)	7A-10A (2) 1P-3P (1) 3P-5P (2) 5P-9P (3) 9P-11P (2)	1A-6A (2) 6A-9A (3) 4P-6P (1) 6P-9P (2) 9P-1A (4)	12M-7A (3) 1A-5A (2)*

ALL TIMES IN PST

WESTERN USA TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Europe & North Africa	7A-9A (1) 9A-1P (2)	6A-9A (1) 9A-12N (3) 12N-2P (2)	11P-1A (1) 10A-12N (1) 12N-4P (3) 4P-6P (1)	5P-11P (1)
Central & South Africa	7A-9A (1) 9A-12N (2) 12N-4P (3) 4P-6P (1)	9A-11A (1) 11A-1P (2) 1P-3P (3) 3P-6P (4) 6P-9P (2)	11A-2P (1) 2P-4P (2) 4P-8P (4) 8P-12M (3)	6P-10P (2) 7P-9P (1)*
South America	11A-5P (1)** 6A-12N (2) 12N-4P (4) 4P-7P (2)	12M-10A (2) 10A-12N (1) 12N-2P (2) 2P-6P (4) 6P-12M (3)	12M-4A (2) 4A-8A (1) 2P-4P (2) 4P-10P (4) 10P-12M (3)	5P-2A (3) 6P-12M (2)*
Guam & Mariana Islands	12N-2P (4) 2P-5P (3) 5P-7P (4) 7P-9P (2)	7A-9A (2) 11A-1P (2) 1P-7P (1) 7P-10P (3)	6A-9A (3) 9A-11A (1) 9P-11P (1) 11P-2A (3) 2A-6A (2)	1A-4A (2) 2A-3A (1)*
Australasia	9A-12N (3) 12N-5P (2) 5P-8P (4) 8P-10P (2)	12M-4A (2) 7A-12N (2) 12N-4P (1) 4P-8P (2) 8P-12M (4)	3A-6A (3) 6A-9A (2) 8P-10P (2) 10P-3A (4)	10P-6A (3) 11P-5A (2)*
Japan, Okinawa & Far East	11A-1P (3) 1P-4P (2) 4P-9P (3)	11P-1A (2) 7A-11A (3) 11A-7P (2) 7P-11P (3)	12M-2A (3) 2A-6A (2) 6A-10A (3) 10A-12N (2) 10P-12M (2)	12M-5A (3) 1A-4A (2)*
Philippine Islands & East Indies	8A-2P (2) 2P-4P (3) 4P-9P (2)	7A-10A (3) 10A-2P (2)	2A-4A (1) 4A-7A (3) 7A-10A (1)	3A-7A (1)
Malaya & South East Asia	7A-11A (2) 3P-6P (2) 6P-10P (1)	7A-11A (3) 11A-4P (2) 10P-12M (1)	12M-4A (1) 4A-8A (3) 8A-10A (1)	3A-7A (1)
Hong Kong, Macao & Formosa	12N-3P (3) 3P-10P (2)	8A-12N (3) 12N-9P (2) 9P-12M (3)	12M-4A (4) 4A-8A (3) 8A-11A (1) 10P-12M(1)	2A-6A (3) 3A-5A (2)*

CQ PROPAGATION CHART (SHORT-SKIP)

BAND (METERS)	DISTANCE (MILES) 50-250	250-750	750-1300	1300-2400
10	-	-	12N-5P (1)	8A-11A (2) 11A-1P (3) 1P-5P (4) 5P-7P (1)
15	-	2P-6P (1)	8A-12N (2) 12N-6P (3)	8A-12N (3) 12N-5P (4) 5P-9P (3)
20	-	8A-1P (1) 1P-6P (2)	6A-11A (3) 11A-6P (4) 6P-9P (3) 9P-12M (1)	8A-2P (3) 2P-11P (4) 11P-1A (3) 1A-8A (2)
40	7A-7P (4) 7P-10P (3) 10P-5A (1) 5A-7A (2)	7A-10A (4) 10A-4P (3) 4P-12M (4) 12M-7A (2)	8A-6P (3) 6P-11P (4) 11P-5A (3) 5A-8A (4)	4P-7P (2) 7P-5A (4) 5A-10A (3)
80	6A-11A (4) 11A-6P (3) 6P-12M (4) 12M-6A (3)	5P-7P (3) 7P-9A (4) 9A-5P (1)	5P-7P (1) 7P-4A (4) 4A-7A (3) 7A-9A (1)	6P-8P (1) 8P-5A (3) 5A-7A (2)
160	6P-7A (5) 7A-10A (3)	6P-8P (2) 8P-5A (4) 5A-7A (3)	7P-10P (2) 10P-3A (3) 3A-5A (2)	10P-5A (2)

SYMBOLS FOR NUMBER OF DAYS CIRCUIT PREDICTED TO OPEN:

(1) 1-4 days (2) 5-11 days (3) 12-18 days (4) 19-26 days (5) over 26 days

*Indicates time of possible eighty-meter openings.

The CQ Propagation Charts are based upon a CW radiated power of 150 watts and are centered on Washington, D. C., St. Louis, Mo., and Sacramento, California. These forecasts are calculated from basic ionospheric data published by the CRPL of the National Bureau of Standards and are valid through October 15th, 1956.

Time Symbols: A - A.M. P - P.M. N - Noon M - Midnight

****Indicates time of possible six-meter openings**

occurring a bit later than the peak on fifteen-meters. Because of somewhat decreased ionospheric absorption, daytime openings will be stronger than during the summer months, and it should be possible to work all Continents with very little difficulty on a normal day. Short-skip propagation is expected from before dawn until after midnight, *local standard time*, with the skip distance as short as a few hundred miles at noon time, and extending upwards to 2400 miles during the late afternoon and evening hours.

40 Meters: Fairly good DX propagation conditions are forecast for forty-meters from after sunset to about sunrise on most

days of the month. Static levels will be somewhat lower and signals somewhat stronger than during the summer months. Short-skip propagation should be possible around the clock, with the skip distance as short as fifty miles during the afternoon hours, increasing to beyond 2400 miles as the hours of darkness approach. During the latter part of the month, a seasonal improvement is expected on circuits to Australasia.

80 Meters:

DX propagation conditions are expected to be generally poor to fair on eighty-meters during September. Long distance openings are likely to occur on a small number of days from after sunset until shortly before sunrise, *local standard time*. Static levels, while somewhat lower, will still be quite high, and signals levels generally weak and fading. During the daylight hours, ionospheric absorption will limit maximum range to less than 250 miles or so, with the range increasing to beyond 2000 miles during the hours of darkness.

160 Meters:

Because of the extremely intense daytime absorption in this part of the spectrum, 160-meter skywave propagation is not possible during the daylight hours. During this period, propagation is by means of the *groundwave* component of the signal, and range is generally limited to line of sight. From shortly before sunset, until shortly after sunrise, ionospheric absorption decreases, and short-skip propagation up to distances of approximately 1300 miles should be possible on most nights, and when the static level is exceptionally low the skip may extend upwards to 2400 miles and beyond.

In addition to the *CQ DX Propagation Charts*, which have appeared in this column for over six years, *CQ Short-Skip Propagation Charts* now appear in this column every other month. This month's *Short-Skip Chart* appears on the same page as the *DX Charts* and are a forecast for September and October, 1956. These short-skip propagation forecasts are based upon a CW radiated power of 75 watts, using a dipole antenna a half-wavelength above ground. Calculations are based upon the approximate center latitude of the United States and actual band conditions in almost any area of the United States should not vary more than an hour or so from the times shown in the *Chart*. For convenience, all times are given in *Local Standard Time* and no conversions are necessary. This means that if you live in Washington, D. C., the times shown are E.S.T., and if you live in Denver the times shown are M.S.T., etc. The author would appreciate comments and suggestions from readers (especially Novice Operators) and users of this particular forecast.

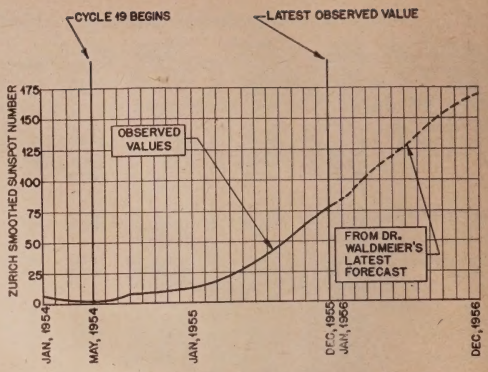


Fig. 1. Present Trend of sunspot cycle 19.

Sunspot Cycle

The Swiss Federal Solar Observatory reports that the monthly Zurich sunspot number for June, 1956 was 116.7. This results in a provisional 12-month *smoothed sunspot number* of 80 centered on December, 1955. *Figure 1* shows the latest trend of the present sunspot cycle, cycle 19. The predicted values of smoothed sunspots have been supplied by Dr. Waldmeir, Director of the Swiss Solar Observatory, and are the latest available as of July, 1956. Sunspot cycle 19 continues to increase at an unprecedented rate and if Dr. Waldmeir's predictions for November and December, 1956 are correct (162 and 165 respectively), this cycle will be higher than any previously recorded. It is of interest to note that Dr. Waldmeir predicted the peak of the last cycle with considerable accuracy.

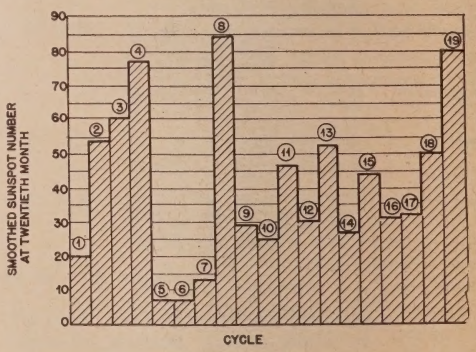


Fig. 2. Comparison of smoothed sunspot number at 20th month of each sunspot cycle.

The exceptionally high level of solar activity occurring during the present sunspot cycle can be seen quite clearly from *Figure 2*. We are now in the twentieth month of Cycle 19, and *Figure 2* compares the level of solar activity observed at

the twentieth month of all previous cycles with the sunspot number of 80 observed for the twentieth month of cycle 19. Except for cycle 8 (the twentieth month of this cycle occurred during 1835), the smoothed sunspot numbers observed during the first twenty months of the present cycle have been higher than observed during the same period of any previous sunspot cycle.

All propagation data utilized for this month's CQ forecasts are based upon a predicted smoothed sunspot number of 142 centered on September, 1956.

Sunspots and Weather

Several dozen letters received in response to "The Sunspot Story; Cycle 19,"[1] make reference to possible relationships that might exist between the weather and sunspots. Since this is out of the field of radio I don't want to take too much time discussing this subject in the column other than to point out that an excellent article on this subject has appeared in the *Saturday Evening Post* of March 24, 1956. The article is entitled *"Cold Weather Ahead"* and is written by Dr. C. Willett, Professor of Meteorology, M.I.T. Dr. Willett states in his article that sunspot activity parallels to a great extent, and may actually control, the climate on the earth. He further explains that circulation of winds around the globe determines the pattern of weather over large areas. The circulation of winds, in turn, depends upon atmospheric conditions that are in part determined by, or coincide with, sunspot behavior and that the increase or decrease in the number of sunspots observed may be a key factor in predicting climatic changes on the earth. Dr. Willett also points out the existence of twenty and eighty year weather cycles associated with sunspot behavior. As the titles suggests, Dr. Willett's analysis leads to the conclusion that old fashioned winters will return to the U.S.A. and that the weather during the next half century is going to be moister and colder, with plenty of snow and ice, less drought and less hurricanes in the Northeast and Middle Atlantic.

1. "The Sunspot Story: Circle 19," G. Jacobs, CQ, March and June, 1956.

Sunspots and Volcanos

Another very interesting letter concerning sunspots, although not in the field of radio, was received from Marion Cole, W4JHI, of Roanoke, Virginia. He writes that during the past several years he has observed a relationship between the major eruptions of volcanos, the earth's magnetic field and sunspot activity. To satisfy his own curiosity, Marion began as a hobby, the collecting of data concerning the possible relationship between these three phenomena. Mr. Cole's letter contained a graph comparing the major volcanic eruptions versus sunspot activity and it appears from this data that a majority of the great eruptions seem to occur during periods of high solar activity. Although it is beyond the scope of discussion in this column, Mr. Cole presents in his letter what appears to be a logical and scientific approach in explaining the relationship that many exist between sunspot activity and the eruption of volcanos. Ironically, shortly before receiving W4JHI's letter, the *Associated Press* reported that Mt. Sakurajima, Japan's second largest volcano, had erupted more than thirty times in a two day period. While reading Mr. Cole's letter, the radio carried a news flash that Mt. Etna in Catania, Sicily was erupting with the greatest violence in several years, heaving up lava, with explosions and fire tongues shooting 500 feet into the sky!! According to W4JHI, major volcano eruptions should continue to occur during the present period of exceptionally high sunspot activity.

Book Review

On the subject of sunspots, I have just finished reading an excellent book recently published entitled *"The Sun and Its Influence"* by M. A. Ellison. Mr. Ellison is the Principal Scientific Officer at the Royal Observatory, Edinburgh, Scotland. The book is published by Routledge and Kegan Paul Ltd., Broadway House, London, England and can be ordered through your local bookdealer. *"The Sun and Its Influence"* provides an account of the structure and characteristic activity of the sun, an account which includes explanations of natural occurrences such as the auroral displays, the fact that the sun burns continuously and does not "go out," sunburn, the sun's radio waves, sunspots, solar flares, and many others which we take for granted and of which we may have little knowledge. The author describes the new instruments for the study of the solar atmosphere and shows how the radiations which the sun emits gives rise to remarkable terrestrial effects. He discusses at some length the effect of these radiations upon shortwave radio reception, and includes an explanation of the formation of the ionosphere and the reflection of radio waves from these layers formed by the sun's radiation. The author also deals with new knowledge about solar flares and the showers of particles which reach us from the sun. Ultra high frequency radio waves being emitted from the sun, and their value in scientific research are also clearly described.

The account is mainly factual, and the book contains over 50 charts, diagrams and other figures. The book is intended for those with an elementary knowledge of science, and should be of interest to all amateurs having a desire to know more about the world around us and the effects of the sun upon shortwave radio reception.

CQ DX Contest

The dates for the 1956 CQ DX Contest have been announced as follows:

Phone

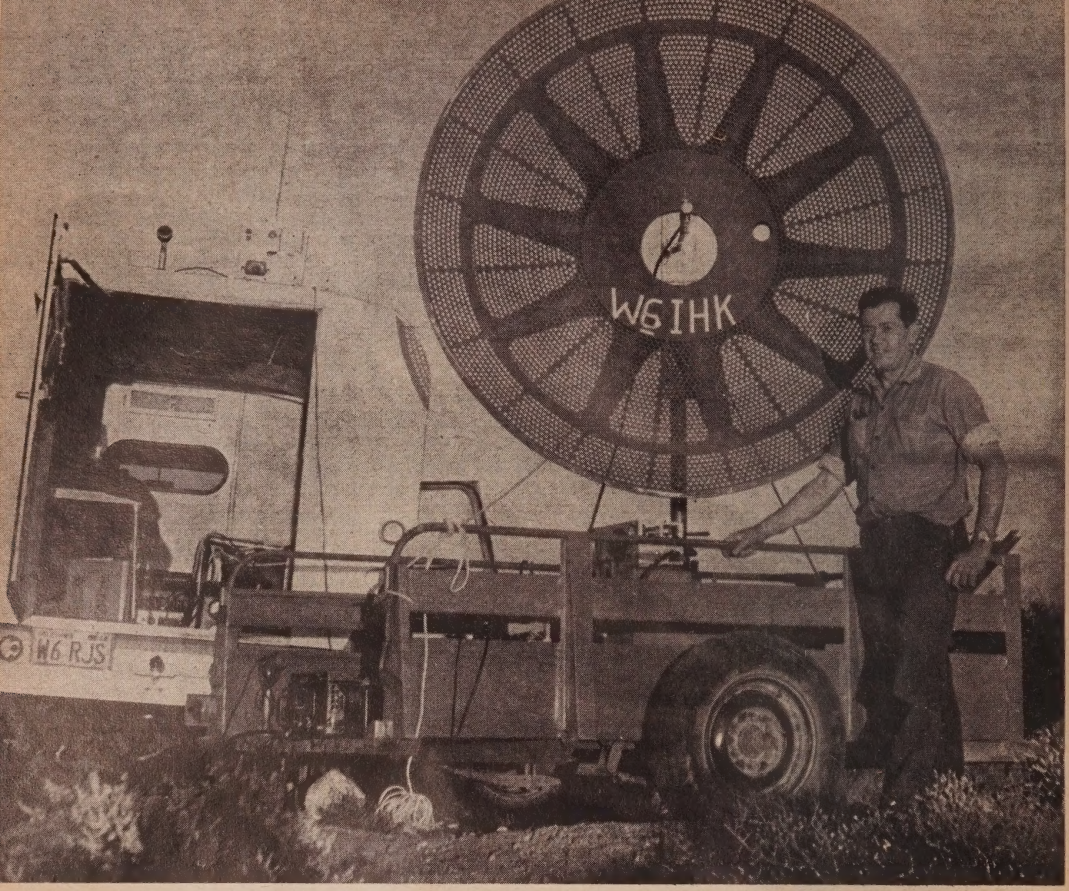
0200 GMT Oct. 20-0200 GMT Oct. 22

CW

0200 GMT Oct. 27-0200 GMT Oct. 29

The 1956 CQ DX Contest will coincide with

[*Continued on page 126*]



This picture was taken at Point Loma, San Diego, California on June 9, 1956. Bill Myers, W6IHK, in company with Frank Reinsch W6RJS, communicated with Bill Baird, W6VIX, located at La Cumbre Peak for a distance of 190 miles. La Cumbre Peak being approximately 10 miles north of Santa Barbara, at a frequency of 1250 megacycles which we believe to be a world's record. The reflector shown in the photograph has a gain of approximately 26 db on 1215 megacycles.

Sam Harris, W1FZJ
P. O. Box 2502, Medfield, Mass.



You may have noticed that my working address has changed to Microwave Associates, 22 Cummington Street, Boston 15, Massachusetts. This change is the result of a very cooperative attitude by the management at Microwave Associates toward amateur radio in general and V.H.F. in particular. I might point out that the people at Microwave don't call it a.c. until it gets somewhat over 5000 mc. In addition to making magnetrons, crystal mixers, TR tubes, and V.H.F. trophies I am trying to interest them in making some new DX records on the microwave bands. We've got all the equipment, all we need is someone at the other end. Any takers?

New Records

While we are on the subject of microwave records, etc., I might as well pass along some information which I received from W6IHK in California. Bill with the able assistance of Frank Reinsch,

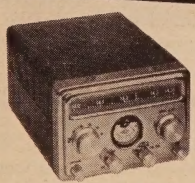
MOBILE TWINS

GONSET G-77 G-66



Gonset's new Mobile Twins, G-66 Receiver and G-77 transmitter, represent the perfect mobile combination. Outstanding multi-band performance—beauty of appearance—finger-tip control—6 and 12 volt operation—compactness without compromise! Typical Gonset dollar-for-dollar value—real "owner satisfaction".

G-66 RECEIVER



New prices

6 BANDS: 540-2000 kcs. 3500-4000 kcs. 7000-7300 kcs. 14,000,14,350 kcs. 21,000-21,450 kcs. 28,000-29,700 kcs.

AM, CW, SSB RECEPTION. Highly stabilized HF and BF oscillators and xtl controlled 2nd conversion oscillator.

STEEP SKIRT SELECTIVITY: 265 kc 2nd I.F. 8 high Q tuned circuits. 3.5 kc I.F. bandwidth at 6 db down.

DOUBLE CONVERSION ALL BANDS: 2050 kc ist I.F. Double input tuning (3 tuned circuits) on high bands for high image rejection.

AVC—Noise limiter—Panel S meter—antenna trimmer—BFO pitch—Audio-RF gain control—slide rule dial—3 watts audio.

G66 RECEIVER...(less power supply).....(#3046).....net 189.50

"3 way" (6V-12V-115V AC) Universal power supply/speaker..net 44.50

G-77 TRANSMITTER



FREQUENCY RANGE: 80-40-20-15-10 meters. VFO or xtal, switchable. Highly stable VFO, each band spread over most of slide rule dial.

FULL BANDSWITCHING: Exciter ganged with VFO, pi network output.

POWER INPUT: 50-60 watts, modulated. CW provisions, 6146 tube in output. New modulator has integral speech clipping. High gain speech for PA-type dynamic, reluctance or xtal mikes.

POWER SUPPLY: Heavy-duty, vibrator, 6 and 12V DC. Output voltage 500-600V full load, Selenium rectifier, low drain both on standby and transmit. Power supply is a separate compact unit.

NOT YET RELEASED, G77 WILL BE AVAILABLE SOON AT YOUR DISTRIBUTOR.

GONSET CO. 801 SOUTH MAIN STREET, BURBANK, CALIF.

W6RJS communicated with Bill Baird, W6VIX over a 190 mile path on 1250 mc for what they hope is a new world's record on this band. The same outing which produced this record also saw a new record for the 3300 mc band over the same 190 mile path. The outing was a planned event sponsored by the San Bernardino Microwave Society. Also present and lending a needed hand were Corky Kirk, W6ORS and Marvin, K6LJQ at the W6VIX end. D. Thompson, W6IFE who supplied the 3300 mc equipment, Vaughn McKenny, W6IBS who supplied the QTH and W60RS who assisted in liaison work, were present at the Point Loma end of the path.

This effort on the behalf of the California boys shows the value of good planning and preparation. Congratulations are in order for all who participated.

Two Meters

A note from Walt, W2CXY informs me that the first auroral contacts between New Jersey and Tennessee *W4HHK* of course and North Carolina, *W4BUZ* were perpetrated on the unsuspecting two-meter boys during the big opening in April. This just goes to prove my point that the signal gets there all right if there is just someone there to help it along a little. Don't forget that by the time you read this you have less than a month to get ready for the beginning of the fall aurora sessions. BE PREPARED.

Moon Bounce

If you haven't heard my moon reflected two or six meter signals by now you had better take a long look at your receiving and antenna system. We heard our own six meter signals for the first time at moonset on the 17th of July. Two meter signals were somewhat more recalcitrant (due in part to trying too hard to be scientific) and were not successfully received until almost a month of fiddling around with antenna and receiver. (By now all those who requested schedules have been accommodated.) Those who did not ask can hear the signals by observing carefully the following rules. Transmissions will only be made between the hours of 1900 EST and 2400 EST. Two meter transmissions are on the first five minutes of each hour that the moon is above the horizon in eastern Massachusetts. (See American nautical almanac.) Two meter frequency is 144.250 mc plus or minus the Doppler shift. As the transmissions will start off with a continuous signal for one minute, ample time will be available for finding the proper frequency. Signal is identified in c.w. and a code word is sent with each transmission for QSL purposes.

Six meter transmissions are only made at moon rise or moon set. (This due to the lack of a tiltable antenna for six.) Frequency is 50.0443 mc. CW transmissions are made in the fifteen minute period before moonset or after moonrise at lat. 42 degrees 15 minutes and consist of one minute calling and one minute listening, timed with WWV. Only the frequencies between 50.00 and 50.050 mc are tuned. My transmissions are always made on the even minutes.

Information gathered so far has been very encouraging. There are some things which necessitate a change in our thinking, such as the fact that the returned signal fades in and out without regard to any controllable or observable phenomenon. Some thought on this leads me to believe that the signals are suffering a polarization shift that is not constant. If this is true, it is obvious that an antenna with circular polarization will be needed to make successful two way contacts. (Such an antenna is under construction for two meters.)

The relative ease with which we were able to receive our six meter signals gives us a considerable boost in enthusiasm. Obviously this medium of communication makes it possible to talk to any one with reasonable equipment and the ability to receive weak signals who is fortunate enough to be able to see the moon at the same time as you do. For instance, the path between Boston and Hawaii is as easy as the path between Boston and Ohio.

Speaking of Ohio, I was very happy to hear a weak and willowy signal from W8PBU in Cincinnati coming in on scatter and meteor skip. His CW signals without the meteors were about even with the noise and with meteors were as strong as S8. Readability was 90% solid. (Naturally I couldn't raise him.) This brings to attention that the boys on six are still missing a good bet by not doing more scatter work. With scatter signals coming in from stations in the 500 to 1500 mile range with power as low as 85 watts, it is discouraging to hear one station in a hundred who uses cw, and one in two hundred who can dig a weak signal.

We are making scheduled transmissions to the southwest at 2015 EST and are looking for schedules with anyone who can receive our signals.

Visits

Headed toward Ohio from Rochester, New York, and intending to make it before stopping for sleep, we were in for another surprise. As each and every ham should do, (I think) we were equipped with a six meter Communicator in the car and of course spent a great deal of time calling "CQ". We were just leaving the New York Thru-Way when we hooked up with K2HRB in Lancaster, New York, and promised to stop in for a "minute" as we passed. So sorry John, we did try to find you but somehow or other passed up Lancaster and we never did find it either.

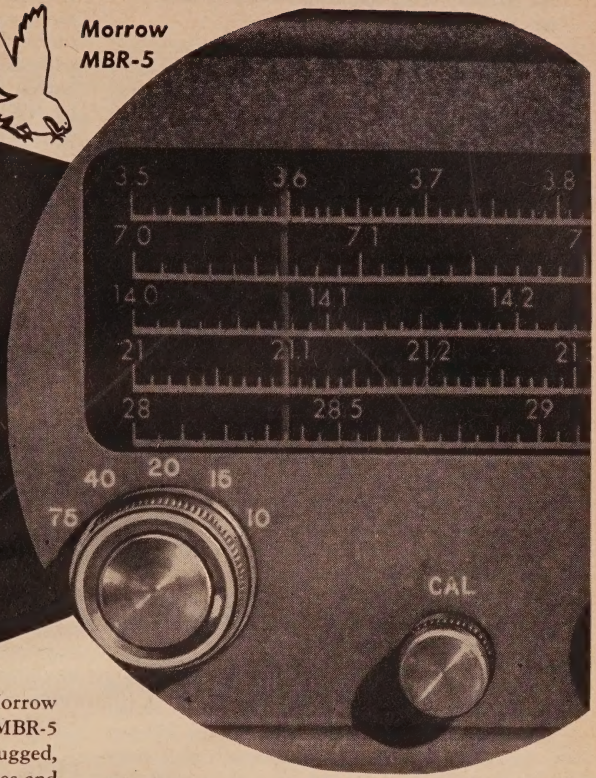
Called a "CQ" as we were approaching Westfield and hooked up with K2MNB, Fred, who also asked us to stop for a few minutes. We let him talk us into it as soon as he mentioned a steak dinner. On arrival we found that Fred is the local taxi-man and he had ordered our steaks (*well-done*), which were put on the table as soon as we sat down in the restaurant.

Then the fun began. Two bites of the steak and a "ham" enters the restaurant, two more bites and another ham shows up. It was a big steak and it surely had lots of bites in it. A good thing too,

Morrow
MBR-5

GREATER SELECTIVITY

"13 tubes, and what do you get? The power and performance of a 20-tube set!"



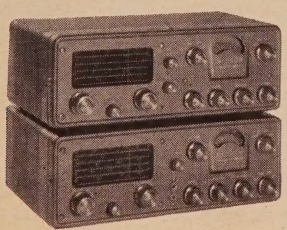
Advanced Morrow circuitry gives the MBR-5 amazing performance in a rugged, compact unit offering more features and more value for your money.

HIGHLY SENSITIVE (½ microvolt on all bands) 100 kc. Crystal Standard built in.

EXCLUSIVE SQUELCH CIRCUIT eliminates interstation noise, but opens on the weakest signal.

SSB, CW, AM RECEPTION. Separate AVC switch.

ILLUMINATED "S" METER measures incoming signals, doubles as field strength meter for tuning transmitter.



COMPACT AND HANDSOME. 4" high, 11¾" long, 6½" deep. Hammertone case matches MB-560.

MBR-5 Amateur net, $224.50

less power supply

FOR CONVENIENT TERMS, SEE YOUR NEAREST JOBBER

Matched Accessory Equipment



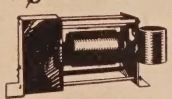
MB-560 TRANSMITTER
"More talk power" on all bands.
90-watt CW, 60-watt Phone.
Amateur net **$214.50**



RVP-250 POWER SUPPLY
Mobile vibrator pack for MBR-5 and exciter of MB-560.
Amateur net **$39.50**



SH-7 SPEAKER
5"x7" speaker in sturdy hammertone case. Amateur net. **$11.50**



MLV-50 INDUCTOR
Motor driven for remote control tuning of whip. Amateur net. . . . **$24.95**



FS-1 FIELD STRENGTH METER
Measures field intensity.
Amateur net **$19.50**

FREE DATA SHEETS — WRITE TODAY!

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radio manufacturing co.

2794 MARKET STREET • SALEM, OREGON
801 Dominion Bldg., Vancouver, B. C.
Prices and specifications subject to change without notice.

Joe (W2UXP) at his operating position in Rochester, New York.



'cause the entire *ham* population of the town turned out to *meet and greet* us. Among them was Russ, W2RJH and Kay, W2GBK from the old two meter days in Ohio.

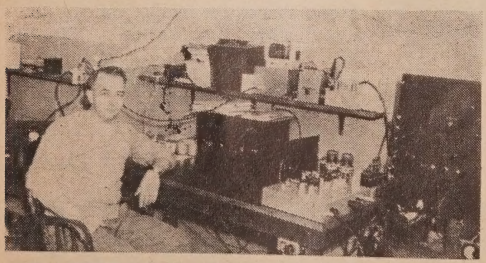
What a "hubbub"! The talk went round and round but we did manage to garner the fact that the boys had formed a new club, *The Westfield Radio Amateur Society* for hams and TV servicemen. Around about 10:30 P.M. Helen began to wonder if we were going to continue our trip or not.

Of course we assured the boys that we had to be on our way to Ohio again, and it ended up by us spending the night with Kay and Helen (*W2GBK and XYL*). What a beautiful hill-top they have, and they've built themselves a cozy ham-shack, with kitchen and all right smack-dab on the highest spot of all. The shack has sleeping accommodations for only one couple, so the *town-house* was delegated to us for the night. Another beautiful, cozy QTH and this one we had all to ourselves as Kay and Helen stayed at the ham-shack.

In the morning we hied ourselves back there, had breakfast, a few QSO's on fifteen meters, a lot of talk and finally did start (*again*) for Ohio. Thanks again Helen and fellows for a very pleasant visit in Westfield.

220 mc

Activity on this band is picking up in the New England area. *Actually if talk is any criteria, there won't be anyone left on the six meter band up here.* W1FOS leads the pack in the Boston area with 300 or more watts to Eimac 4X250 B's and a sixteen element beam. DX is still being provided by K2GRI in Porter Corners, New York. At this writing we have been able to hear a couple of stations with our poor receiver and the six meter sterba curtain. (Transmitter is still under construction.)



Len (K2CEH) looking pretty for the photographer (me). Note beautiful 826 final. Please send letters asking him to write constructional article on same.

News has reachd us that Dick, W9EQC is moving his QTH and will be off the air for an undetermined length of time. The 220 mc boys will miss your signals Dick. Hurry Back.

Two Meters

Two meter activity has failed to come up to the usual summer high in this area. The lessened activity on two is reflected in an increase in six meter population. The dx minded are still pounding away however. W1RUD is taking care of the dx in Massachusetts with W2CXY, W2AMJ, W8KAY, W4HHK etc., taking care of their respective areas.

W2NLY is reputed to have his big beam back in operation and *I am told* is keeping moon bounce schedules with W6QKI. I guess the schedules are being kept a secret as no one seems to know the times or frequency. *W2NLY has been heard making noises on the bottom edge of the band which might indicate that this is the frequency of choice.* After all the work they have put into their effort, I certainly hope that they are successful in establishing contact. I would, however, think that their efforts would be of more benefit to the amateur fraternity if they would enlist the cooperation and support of the rest of the amateurs on the band.

Letters

Amarillo, Texas June Patterson (W5BXA) sends us a note about activity on six meters. June says:

> "There are three other stations here on six meters. We are trying to keep activity high in the Amarillo area. I had a good opening on Saturday, April 14th. We have begun to work on WAS on six meters but have a long way to go yet." *Keep up the good work, June, we're still looking for you up here.*

Stamford, Connecticut Old John (W1BOM) writes:

> "I have a Collins 75A3 and would like to build a crystal controlled 50 mc converter for it, with 26-30 mc output. Would appreciate any help you can give." *Any of you 75A3 owners who have solved this problem, please send dope to John.*

Langhorne, Pennsylvania From the high scorer in the Keystone State, Ray (W3TDF), the following preview of what he was going to do (*and did*):

> "From the comments I have been overhearing on the air this should prove to be an up and coming contest. Let me be the first to congratulate you, Sammy. Will drop you a card or short letter to let you know the results in this area. Lots of luck with all your endeavors." *Those 8,000 points look pretty impressive up here, Ray.*

Elizabethtown, Kentucky Shelby (W4WNH) advises us that:

> "W4HJQ's 96 element special UHF resonator is

be sure the MOBILE RECEIVER you buy has all these advantages

Extreme stability, electrical and mechanical.

12 tubes, many dual, not counting rectifier or regulator tubes.

Accurately calibrated dial—vernier tuning for sideband and CW reception.

Separate sensitivity and volume controls

Seven-position turret band change. #1: 550-1650KC. #2: 1650-3500KC. #3: 3500-4030KC. #4: 6990-7310KC. #5: 13970-14360KC. #6: 20990-21450KC. #7: 27950-30000KC. No backup necessary.

Extreme selectivity. 3KC bandwidth-no skirt flare-signal passes through 14 high-Q tuned circuits on all high frequency bands.

Dual conversion on all high frequency bands. Crystal-controlled second mixer. Temperature-compensated first (tunable oscillator) mixer. 2.2 Mc first IF and 265 Kc second IF frequency.

Fully Automatic threshold-type silencer (not a limiter)—operates in early portion of IF circuit.

Superior squelch performance made possible through use of above **silencer** circuit.

Front panel controls comprising main tuning, vernier tuning, function switch—AM, calibrate, single side band and CW position—BFO pitch ±3 Kc, volume control and "off-on" switch, antenna trimmer silencer "off-on" and squelch threshold control, sensitivity control (manual RF gain).

Single side band voice control and AM break-in.

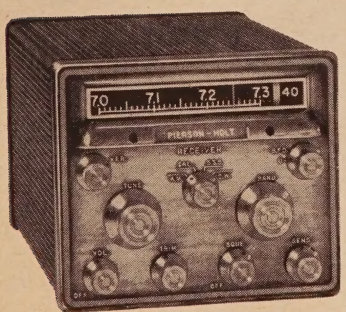
Voltage-regulated tuning oscillator heater.

No wiring changes necessary in receiver to operate on 6 V.D.C., 12 V.D.C., or 110 V.A.C.

No wiring change necessary in power supply to change from 6 V.D.C. to 12 V.D.C.

3 Watts audio output—external 6" x 9" heavy-duty speaker optional.

Truly versatile universal mounting brackets supplied with receiver. No drilling of receiver case required.



You'll find all these advantages, and many more, in the
KE-93 RECEIVER
on display at your dealer.
Write for literature.

PIERSON-HOLT *electronics*
2308 W. WASHINGTON BLVD., VENICE, CALIFORNIA

up and working." *That sounds like a big beam, Shelby, but I still haven't heard you up here.*

Van Buren, Ohio Del (W8VOZ) has more comments on the two meter CW band:

"Received my CQ magazine yesterday and, of course, I read the VHF section first. *Of course.* Think you have a very good write-up in the July issue. My comments regarding an exclusive CW band on two meters. Your idea of the simple solution comes from a very brave amateur. I sure want to thank you for that. How many others would be brave enough to even suggest such a thing?

"I believe there is much more phone hours of QSO on two meters than there is CW QSO. Therefore, why not all the proponents of a CW band section apply for a part of the band where there is no phone to speak of. Say from 145,500 to 146,000 kc. I will even stick my neck out and say the phone fellows will be in favor of that. After all, more than one phone QSO has been knocked out by a KW of CW. The CW fellows being a minority, should do the moving, rather than wanting the majority forced out for their benefit." *Glad to hear from you, Del. Anybody else got any suggestions?*

Via Whitman Massachusetts From W3YHI Andrews AFB by way of W1BPW the following disheartening information:

"Department of Navy closed down historic Navy Radio Arlington, effective 30 June 1956. This station was source of so-called Washington marker beacon near 143.8 and 148.1 mc. Those signals no longer exist. Please caution two-meter gang not to depend on hearing those signals as indication that the two meter band is open." *Sure sorry to hear this. I hope the signal from La Guardia keeps going.*

Feenix, Virginia

"Deer Hon. VH&F Ed: You gessing it—Ole Geenyus Scratchi are going to the moon to relay siganels back to errth. Only having to need one things,—skedule of what times are needint to tune Hon. Two Meter Band. Respectively yours, Hashafisti Scratchi."



Cathode line and drive injection point on Jerry's 1 KW two meter final. Entire unit is silver plated.

Feenix, Tennessee

"Deer Hon. Moon Bounce Ed: Hon. Brother Scratchi are not going to be hurting for RF's on moon on account he running pair 4-1000 toobs. No FCC up there you know! Howsomever, he not expecting to find L.V.A. (Lunar Valley Authority) capable of supplying filament powers indefinitely. Since he are taking moon bounce skedule and sun batterys (Moon batterys still not developed economikle) I are needing to have moon bounce skedule to know when to be tuning for him. Respectively yours, Brother Itchi Scratchi."

Deer Lodge, Montana Conrad, W7WVM says:

"I hear some of the boys are shouting bloody murder for Montana activity. Well, I'm doing my best to give it to you.

"I will be either on two meters or 220 mc. The QTH will be at an altitude of 6,000 feet. Then if you guys can't hear me, I will go portable on top of old Mt. Powell which is of an altitude of 12,500 feet, a straight shot to W5.

"Those will be real cool QSO's because average summer daytime (summertime) temperature is —25°. I would appreciate letters from *all* VHF'ers as I'm new to the VHF rank." *No excuse for not having Montana now!*

Yakima, Washington Paul (W7PQE) asks:

"I plan on buying a converter for my Collins 75A1. Know anything about the Tecraft converters? Or any better buy? I want something that will do a fairly decent job. It shouldn't be so hard to pick up a decent used six meter, but hasty glances at recent ads haven't shown any. TVI isn't bad here, TV being uhf, so I might end up by tossing a transmitter together. But want to get receiver and antenna up first to give me a bit of interest. Any suggestions." *Lots of fellows using Collins receivers with crsytal controlled converters, Paul, I'm sure you'll hear from some of them.*

Lewiston, New York From Dave (W2VLL), some six meter teletype information:

"As is obvious to you I am printing this on a RTTY machine. A Model 26 to be exact. During the later part of the April 15th opening, I sent RTTY on six. As had QSO'd several stations on phone who said my 40 watts was loud, there is no doubt that it was heard. No customers though. If anyone writes in complaining about the queer audio tones they heard, let me know, as I'm curious.

"I am a protege of Roy Wiese (W2TKO), RTTY in Buffalo and there is an autostart net on 147.5 mc between Niagara Falls, Buffalo and Lockport (W2ALR). I transmit RTTY on two and six meters and at 3620 on 80. My spies tell me that you have a Model 12. Perhaps we will meet. I'd get most excited over it if it happened on six. My frequency 50.4 mc." *My Model 12 is steaming away, Dave. Look for me on 6.*

Groton, Connecticut Carl (W1FVY) passes along some practical dope on the WØHKF soup strainer.

"I got busy last Saturday as soon as I read the article. When I finished I found that I could not get the thing to tune above 48 ms with 2-$\mu\mu f$ padders, so put in 100 $\mu\mu f$ units and found that with about 120 $\mu\mu f$ in I tuned 50 to 51 easily. As I looked it over more critically, it appears that it might be desirable to add one more 7" high can and enough more (2) juice cans to make the unit nearer the desired length. This I haven't done yet due to lack of additional cans! The unit I built sure cleaned up my own TV here and I 'hope' for the neighbors." *Come on boys, send Carl some juice cans.*

Detroit, Michigan Dick Cotton (W8DX) gives us a rundown on his gear:

"Now running 1 KW to a pair of VT127A's driven by a pair of 826s. Using a 45 element beam (see enclosed pictures) about fifty feet high. Still using NBFM on phone and same receiver with 417-A converter.

"From pictures you will note that I also have 30 element beam for 220 mc and an 8 element bow-tie beam for 432 mc and three elements for 50 mc, all on same rotator. Have worked 23 states and 8 call areas so far and all verified. Also 5 states and three call areas on 220 mc. Run 300 watts to pair of 826's on 220 and 50 watts to a 5894 on 432 mc." *Worked New England on six yet, Dick? You have. How about 432 mc? I'm a'waitin' fer ya.*

Cincinnati, Ohio Ev Taylor (W8NAF) sends some interesting notes on the recent K8AIR/AERO:

"Dear Helen and Sam, I wish to thank you both in the interest shown in my project from W-P AFB of recent date regarding K8AIR/AERO. Charlie, W8JSR, and I got together and compared notes today and it seems as the W1HOY 1KW shows great promise as to potential 'scatter techniques' in the amount of power required on the ground.

"As Charlie told you, he was using a Gonset. It was running off a 400 cy. inverter and the 'sky-huk' was a 54 inch whip mounted top-side from the bomb-bay on the B-50. The measured output (on the bench)

RADIO OPERATOR-TECHNICIANS

THE U. S. Government has a continuing requirement for single and married men between the ages of 20 and 40 with radio operator-technician experience. Individuals with less than minimum required experience can qualify for training. Persons with past applicable experience, who for some time have been out of touch with this type of activity, will be refreshed. Assignments are overseas at interesting foreign posts.

STARTING annual salaries, which will be determined by the applicant's experience and ability, range from $3670 (GS-5) for trainees to $4970 (GS-8) for fully qualified men. Normal promotional progress within this salary range may be expected when quality of performance dictates. Beyond this latter level advancement possibilities exist on a selective and competitive basis. Standard government allowances are paid in addition to the salary.

A VARIETY of foreign posts is available. Rotation of the employee and his family from post to post is accomplished in accordance with standard government regulations and usually involves tours of 24 months duration at each post followed by Stateside leave between assignments. Work is challenging and varies from post to post. If you are in good health, not subject to military draft, and are interested in the above openings, please write—

DAVID R. RINGLAND
U. S. Government Personnel
Post Office Box 6478, "T" Street Station,
Washington, D.C.

When writing please give us the following information:

1. Name, address, telephone number, and hours when you can be reached;
2. Date of birth;
3. Military history including dates, schools, experience, grade or rank, and MOS (primary and others);
4. Civilian training and experience;
5. FCC license if any;
6. CW speed;
7. Typing speed;
8. Marital status and dependents.

If your letter indicates that you have the required qualifications, a local interview will be arranged in the near future.

was 7 watts at 400 cy. and about 4.6 watts radiated. The antenna was grid-dipped to about 49.7 mc and there was some loss due to his operating frequency of 51-plus mc.

"This distance (280 miles) gives me quite a degree of encouragement in regards to future flights. This particular one was a quick and dirty one as we were 'piggie-backing' with another project. I have made arrangements to get a C-47 and we will be making additional flights within about a month. He was having no-end of QRM from the other project aboard the B-50.

"Perhaps, it may be of interest to you as to other stations that Charlie contacted in the excess of 200 miles: K8AIR/8 (me), Gonset plus Director Beam as per Jones in April '55 QST (Vert.), W8HTD 45 watts and 4-el. (Hor.), W4DZO 140 watts and 4 element (Hor.), W4FWH 60 watts and 3 element (Hor.).

"The trip to California and back did not pay off too much as activity was pretty poor. I heard Charlie five minutes this side of St. Louis (in-bound) but he could not hear me.

"Charlie tells me that the K6 and W6 gang sure gave him a hard time when he was flying over Arizona. They *NEED* Arizona toward WAS but it does not count. He worked W5SFW and was asked to continue on to Vermont. HI! I am planning on setting the flights up from W-P AFB to up around Erie, Pennsylvania, and a 90 degree arch to the south and back to W-B AFB, and from here to up around Chicago and down to Evansville, Indiana, and return, with the A/C zig-zagging between 250 to 300 miles from here during the arch."



Radio Room at W2UTH. Spectators watching photographer are Paul Day (W1PYM), Bob Rafuse (W1RUD), and Henry Blodgett (W2UTH).

Tucson, Arizona: Jerry Walker gives us some dope on his new high-power find:

"Dear Sam, Thought you might like a peep at our new cool kilowatt for two meters. It's a grounded grid, forced air deal and uses a 5762 from KVOA-TV. After 2½ years of picture service in Tucson, it was retired to two meters. The outer tank is 10" in diameter and 19" long. The inner tank is 5" in diameter and the tube mounts on top of it with the air blowing up through it. The 5762 drives nicely to a kilowatt with a pair of 826's or 4-125A's. At present the latter is in use here. W7UPF (Local) reports the signal sharper than the former KW with VT 127's. Also no TVI reports as yet at this rural location. This go-round feeds a 64 element antenna (8 of 8) receiver 417A's in cascode and RG 17 feedline. Please send moon bounce skeds, HI. National calling of 144.250 sounds best to us due to very low activity in the southwest. Best DX on the above deal is W6NLZ in L.A." *Sounds terrific, Jerry. Moon bounce skeds on the way. Please send spare 5762. Hi!*

Elizabethtown, Kentucky Shelby Ennis (W4WNH) sends more Blue Grass news:

"The auroras have been very good lately. We each got two new states. Tom now has 17 and I have 15. But we just can't seem to get a W1. We heard several, mostly from Connecticut, but one from Massachusetts. Couldn't work them, though. What we needed was your kw and little beam up there. I now have xtal-controlled converter (as if there were something else) and three-element beam about 10 feet above ground for six. Haven't been able to get quite enough drive from my BC-625 to drive my 829-B to full power yet, but I'll be on some of these days, MAYBE. Have heard quite a few, though. Tom's beam (0Q element) is doing OK so far. Last night he thought maybe he heard some real DX but I'm afraid we will never know for sure. It was a CW signal on about 144.145, with a flutter that DX signals often have. We aren't sure what it was. So, you might let us know when you really start pumping the juice toward the moon; and Tom (W4HJQ) will probably be your first Kentucky QSO. But please don't forget to look for me on 144.127, too." *Glad to hear from you again, Shelby. I am getting good six meter scatter signals from your area. (Note the scatter sked listed elsewhere).*

St. Clair Shores, Michigan and the land of the Blue Cat, Verle (W8BGY) gives some dope on connectors for 75A's:

"Hope some time to work you on two—been a long time since we heard that vertical with the rotatable reflector on 75, HI! Enclosing a couple of pictures of the XYL's converter work. Thought you might like to see them. She was building them for some of the gang that had 75A type receivers and couldn't get converters for them. Guess they can get them now so she probably will close down the 'converter factory.' Sending in our logs—not much, but guess they will show activity. Hope you keep it up as anything that promotes any type of activity on 2—we're for it. *We* didn't like keeping the Technicians off!" *A lot of the fellows would like more information on the converter, Verle. Why not write it up?*

Oil City, Pennsylvania Joe (W3LST) says:

"Just a few words to let you know it is very likely that I will be on the air with my new rig with a small change of plans. Instead of 600 watts to 4x150, it is now a KW to 4x250's. I am sure you will be hearing my signals before too long. Next step is converter improvement. That 416A pre-amp in CQ—is it a joke or is it serious. Would appreciate a little more dope on construction details and components." *That's no joke, Joe. Return the grid to a variable bias supply 0 to —5V. Adjust plate current to 5 Ma and you are in business.*

Geneva, New York 521 White Springs Road, Bob Groh wants information:

"Could you please get someone to think up a cheap, efficient noise generator for VHF receivers and then publish it? I couldn't find a single thing in my '54 Radio Amateur's Handbook on noise generators or anywhere else." *Can anyone help Bob?*

Brooklyn, New York Jay (K2PBS) has three questions:

"I have noticed that lately you have been pressing six meters very much in your VHF column in 'CQ.' I think it is a very good idea. Do you plan to have any equipment that everyone would like and want to build appear in the near future in 'CQ.' Is it possible to use two separate folded dipoles with separate feedlines and a switching system? The dipoles would be at right angles to each other." *In answer to your questions, Jay, we sure do; you sure can; and they sure will. Data on feeding dipoles at right angles is available in several of the Radio Handbooks.*

Streator, Illinois Bill Flanigan asks for help:

"I read your VHF news with interest. As a novice I worked 15 meters with some success, now I am waiting for my conditional ticket to arrive, in the meantime I would like to convert an ARC-5/T23 VHF Xmtr. I can't find a word about this transmitter, except in March '56 'CQ' on page 74. Now what I want to know is where can I find the information to convert my ARC-5 as Dink (W8IJG) has done? Could you give me any clues, Sam? I would also like to know how to put this transmitter on two meters FM." *Might try writing to Dink. A good version of the T-23 also appeared in Bill McNatt's VHF News. If enough interest is shown, we might do a reprint. Any takes?*

[*Continued on page 96*]

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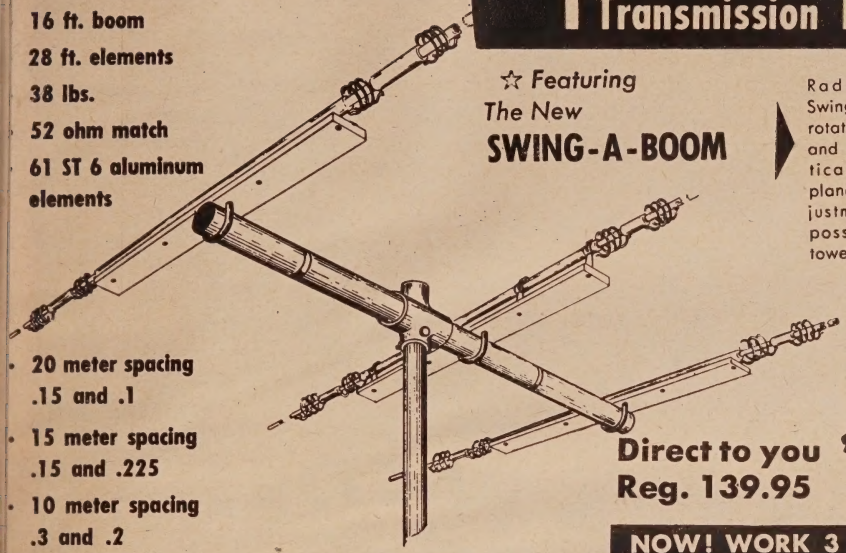
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There are a passel of countries on SSB these days.

Bob Adams, K2DW
245 Revere Road
Roslyn Heights, N. Y.

Not since the period following World War I, when ex-President Herbert Hoover, then Secretary of Commerce, helped to get our stations back on the air, and also after World War II when ex ARRL President George Bailey, W2KH spent untold hours in Washington cementing our relations with the Armed Services, have we amateurs enjoyed such close association with the USAF. SSB is responsible!

Our thanks to KØDWC, Major General F. H. (Butch) Griswold, Vice Commander, Strategic Air Command, who with Art Collins, WØCXX on an AF Globe Master plane equipped with SSB ham gear, flew to the Far East, and also over the North Pole and proved the superiority of SSB over AM.

"Butch's" boss, General Curtis LeMay, KØGRL, Commanding General of the S. A. C., has recently come on the air with SSB and will shortly have SSB installed in his C97 plane. Don Merten, W2UOL who made the installation flew from Omaha to Mitchell Field, New York with General LeMay working the SSB gang enroute. Watch for news of another AF trip. Here is Art Collins' report of the epic Arctic flight:

The Strategic Air Command, Collins Radio and amateur radio operators worldwide collaborated in July for the first flight tests of Single Sideband (SSB) communication in the North Pole region.



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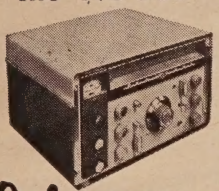
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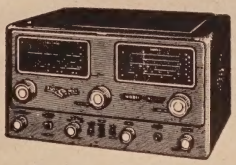
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the NC-300



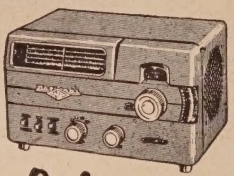
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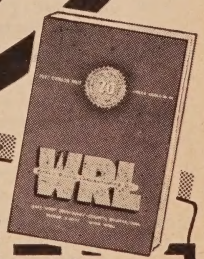


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SSB tested over the North Pole in this C-97

Commercial ham equipment—a 75A-4 Receiver and KWS-1 1-kilowatt transmitter—installed in the passenger compartment of an SAC C97 enabled the operators to work all continents and maintain contact at all times with hams in the U. S.

The experiments were carried out aboard a plane used by Maj. Gen. F. H. Griswold, Vice Commander of SAC, in a routine inspection tour of SAC bases.

Operators of station *WØCXX/Mobile* were General Griswold; Arthur Collins; Col. John Bestic, chief of SAC communication/electronics, and Lt. Philip Ferrell, Rome Air Development Center.

The trip over the top of the world originated from SAC headquarters at Offutt AFB, Neb., June 29 and included stops at Andrews AFB, Md.; Mitchell AFB, N. Y.; Portsmouth AFB, N. H.; Loring AFB, Me.; Harmon AFB, Newfoundland; Goose Bay AB, Labrador; Thule AB, Greenland; Anchorage, Alaska, and Travis AFB, Calif., ending at Offutt July 7.

During the leg of the trip between Thule and Point Barrow, Alaska, the C97 flew approximately midway between the geographic North Pole and the magnetic North Pole.

SSB operation proved very effective in polar communication, with SSB signals loud and clear while conventional AM and CW signals were difficult at times to understand because of bad fading caused by auroral disturbances. Although auroral flutter was observed, communication was still possible with SSB. An S-9 or better signal was received at all times in the United States.

A favorable communication factor was the low noise level characteristic of the polar region.

Direct interpolar communication was established between WØCXX/M, operating from Thule, and KC4USA (Little America) and KC4USV (Ross Island), ham stations of the Navy's Operation Deepfreeze on Antarctica. Contact was maintained at regular intervals for three hours on the night of July 3 and for seven hours the following night.

A two-way relay between North and South Poles was established, with WØCXX/M picking up the Antarctic station signal and retransmitting it on another frequency back down the 11,000 miles to Antarctica.

This link-up between North and South Poles was significant for the test because it involved two auroral zones, one in summer and the other in winter condition.

The Arctic was in the midst of summer with 24 hours of daylight, while the Antarctic was in winter with 24 hours of darkness. At one contact, the temperature in Antarctica was 28° blow zero with a 30- to 35-knot wind, while the temperature at Thule was 48° above with only a 4° above with only a 4° temperature spread during the day.

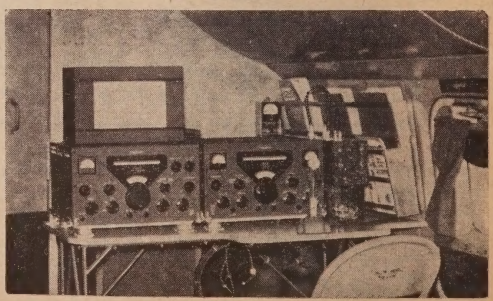
As a sidetrip during the stopover at Thule, Art Collins flew on a ski-equipped C47 to visit an outpost on the ice cap. The American servicemen stationed here, who call themselves "ice worms," live and work in a network on and in the ice built of 12-foot corrugated steel culvert.

Throughout the Arctic flight, numerous phone patches were made to Air Force personnel all over the United States and to families of the flight crew. The aircraft ham station communicated with SAC's Commander in Chief, Gen. Curtis LeMay, both by phone patch and by direct ham radio.

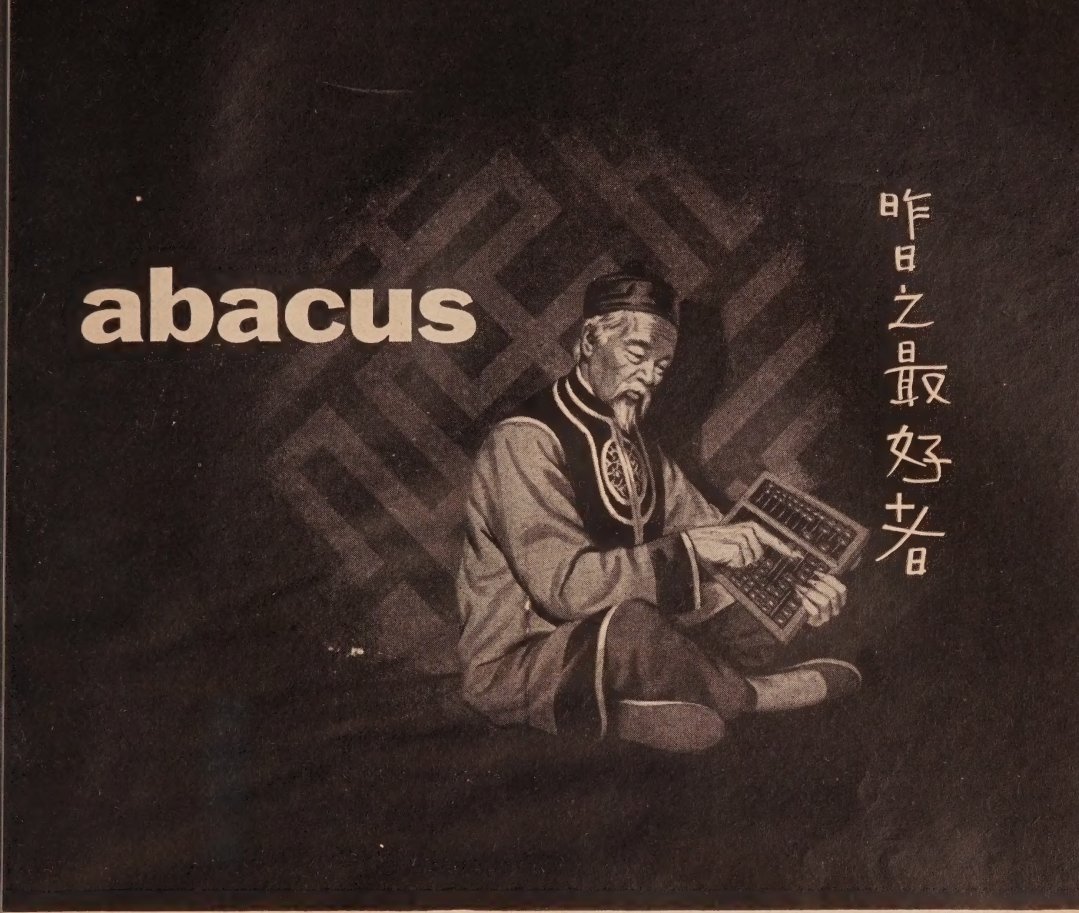
An interesting call was one received from a person who identified himslf as a ham in Moscow.

All told, the C97 logged approximately 1200 contacts with approximately 25 countries on all continents in its 10,000-mile flight. Practically all communication was on the 20-meter ham band, using the upper sideband, with some on 40 and some on 15 meters.

A 27-foot antenna, running from the top of the fuselage to the tip of the vertical stabilizer, was



75A4 and KWS-1 in C-97. WØCXX/Air



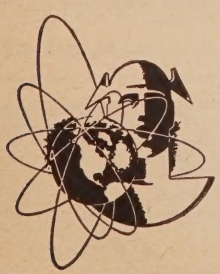
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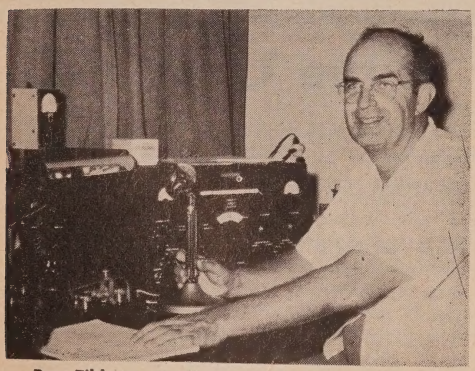
used predominantly, although the ham station also had a 60-foot antenna, running from fuselage to horizontal stabilizer. In addition to the KWS-1 and 75A-4, the ham installation included an antenna tuner and an R-390A Receiver for general listening.

Among the ham stations actively participating in the tests were KØEXI, KØSYF, W5ZO, W5CVE, W2GU, W7BA, K6EB/6, DL4YU, KØAIR, W6ITH, W8HAF, W5BNX/VO6, KØAAZ/VE8, VE8ML and VE6FI, to name a few.

Aboard the 70-ton Stratofreighter for the Arctic trip were Melville B. Grosvenor, Associate Editor of National Geographic Magazine, and Gil Roberts, who were preparing a story on SAC operations for that magazine.

Results of a similar SSB experiment in flight over the Pacific March 25 to April 3 were equally favorable. The itinerary included Great Falls, Mont.; Fairbanks, Alaska; Anchorage, Alaska; Andreanof Islands; Tokyo, Japan; Okinawa; Guam; Kwajalein; Honolulu, Hawaii; Travis, and Offutt. On this 15,000-mile flight, over 1,000 contacts were made with 26 countries on all continents and Little America. Again virtually continuous contact with stateside stations was kept.

Art Collins announced a prize would be awarded to the ham with the strongest signal as the wheels of the plane touched ground on his return from the Arctic trip. Bob, W8DNY won the prize. Not to be outdone W2UOL also announced a prize for the strongest signal as General LeMay touched his wheels after the recent Omaha flight. Your conductor was the lucky winner of a transistor frequency standard.



Reg Tibbetts, W6ITH, at the operating position of PJ2MC, his station on the Dutch side of Saint Martin. SSB? Of Course!

Breaks

Danny on the YASME expedition is now on Nauru Island signing VK9TW, SSB, courtesy of Eldico. K2AAA will shortly install an SSB rig for Arthur Godfrey, ex W3KY.

New "Aussies" heard recently are VK3SK, VK2ZY and VK4MW. Ramsey, VK4AB will visit the USA in January. YV5FL who gave so many of us WAC last year finally made WAC himself after 1½ years of effort. Congrats Corney. TF3CJ, Carl in Iceland is active since coming on side-band two weeks ago. GW3EHN likes SSB so well that he has been staying up until 4 a.m., his time, working the boys. Oscar has a big signal in the USA. ZD4BF, Joe will go to England July 30 for six months vacation. His new QTH is P. O. Box 2, Usuta Wassaw, Gold Coast. Hurry back Joe.

W2CFT is having a fine vacation visiting the SSB gang in Europe. ON4CC and PAØIF are heard regularly. KT1DD, Don is in the USA on vacation but Frank, KT1PU is very active. We welcome VQ4EO, VQ4EU, 4X4AA (who attended SSB dinner in N. Y. C.), VQ5EK, PJ2MC, SVØWE, ZD1BZ, G3AOO and G5BJ to the ranks. Wayne, HR2WC wrote in to say that he is active on 15 meters and that FS7RT/PJ2MC finds working the low end of 15 is very productive. John, PY2JU wrote a nice letter and hopes to be on very soon with his new 500 watt linear.

Last Minute Items

George, W2DR is finishing up his around-the world trip and will soon be home. He visited many SSB hams, including ZS6KD and VK2VA. We wonder what has happened to 4S7YL in Ceylon, who was so active several years ago. Empty, ZS6KD has worked 48 countries and we hear by the grapevine that DL4KS has passed 50 countries. Your conductor made it 50 with TF3CJ. In next month's issue we will inaugurate a Countries Worked List. Please let us have the information on your Countries Worked as soon as possible. Do not send your QSL cards until you have reached 100 countries. W2UOL has recently announced a wonderful prize to the first station to work 100 countries two-way on SSB.

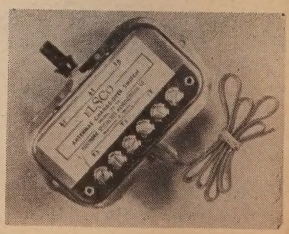
W4API has been heard regularly using F7EM's transmitter in Paris, and he expects to stay in France for several years.

We again wish to express our thanks for the many fine letters which have been received from our readers.

73, Bob, K2DW

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World Wide DX Contest

Rules are outlined in the August issue of CQ, page 95. However the form of the reporting sheet has been changed to that shown. Copies of the rules, report and extra log sheets are available for the asking if return postage is sent along with your request.

Briefly, the contest is in two sections. Phone: 0200 GMT Oct. 20 for 48 hours. CW: Same time starting Oct. 27th. Seven bands will be used with Phone competition broken into Single and Multi operator classes. CW will be divided into Single, Multi and Novice operator classes. Inter-Club competition also counts as a separate class.

No limits as to number, power or type of equipment used.

CW stations exchange five numbers, the first three their RST, the last two their own zone number. Phone stations exchange four numbers, the first two are RS while the last two are the zone numbers of the respective stations. Scoring, points, multipliers and awards were listed last month.

Note: Last WAZ map; Dec 55 *CQ* p. 25.

All Band Entry ☐ Phone ☐ Station Call Letters_____

Single Band Entry ☐ CW ☐ Number of Operators_____

CQ WORLD-WIDE DX CONTEST

Band	QSO'S	Zone Multipliers		Country Multipliers		Points		Score	Band
1.8 MC			✓		X		=		1.8
3.5 MC			✓		X		=		3.5
7 MC			✓		X		=		7
14 MC			✓		X		=		14
21 MC			✓		X		=		21
27 MC			✓		X		=		27
28 MC			✓		X		=		28
TOTAL			✓		X	/	=		All Bands

INSTRUCTIONS: To determine All Band score, total each column with the heavy lines. Single band stations are permitted to operate on more than one band. However, indicate and total ONLY the band you wish judged.

Transmitter Description and Power_____

Receiver_____

Antennas_____

Other Operating Aids_____

Remarks (Suggestions, Criticisms, and Comments)_____

Club Participation_____

This is to certify that in this contest I have operated my transmitter within the limitations of my license and observed fully the rules and regulations of the contest.

Name Call

Street and Number

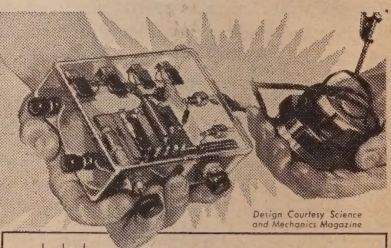
City Country

Logs must be postmarked not later than December 1, 1956.
Submit logs to CQ Magazine, 67 West 44th Street, New York 36, N. Y. Att: Contest Comm.

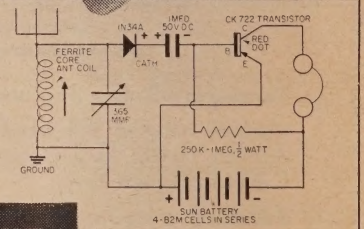
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★ Selectable side-band operation. ★ "Tee-Notch" Filter rejects unwanted heterodyne, steepens I-F pass band, and boosts exalted carrier type reception. ★ Notch-depth control for maximum null setting. ★ Antenna trimmer. ★ Plug-in evacuated 100 kc crystal calibrator. ★ Two precision-gear-drive logging dials. ★ Crystal-controlled second-conversion oscillator with new temperature-compensated HF circuits.

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The best for back-pack and automobile. 28-80 MC, AM. Modifications necessary for amateur use are easy and explicitly shown in simple instruction sheet furnished with your order. This is the famous Marine Corps' TBY. Original power supply not included, but power supply which you can use is spelled out in these instructions.
Transceiver Unit only, excellent, used condition, with tubes. Special..... **$14.95**

COMBO DEAL: The above transceiver and instruction sheet PLUS headset and microphone and **AN75 Antenna** all for only..... **$24.95**

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Both in one compact unit! Brand new with schematic. Also 5.25 and 30 mc. inputs. The only modification required is to replace only one power transformer with 60 cy. units we show you how to find in your hell box and how to connect. ID-60/APA-10. A gem that cost govt. $1,000! Yours for only..... **$49.50**



MATCHED MINIATURE METERS

Gorgeous new line—not surplus! Only 1⅝" square. 1¼" hole. Handsome black calibration on white face. 2% accuracy D'Arsonval movements. Guaranteed!
DC Microamperes: 0-50 . . . $5.95. 0-100 or 100-0-100 . . . $5.50. 0-200 . . . $4.95. 0-500 . . . $4.50. **DC Milliamperes:** 0-1, 0-100, 0-200, 0-300, 0-500, any one . . . $3.50. **DC Volts:** 0-15, 0-30, 0-500, any one . . . $3.50. **DC amps:** 0-10 . . . $3.95. **RF amps:** 0-3 . . . $5.95. **AC Volts:** 0-15 or 0-150, either one . . . $3.95.

THE 2 HOTTEST RECEIVERS IN SURPLUS!!!

Extremely easy to make power supplies for both. Both come with schematics and instructions for the simple modifications required. Both are super-sensitive, super-selective superhets. **2 METERS: R-28/ARC-5,** 100-156 mc, in excellent condition with all 10 tubes. Best 2-meter rcvr built.
420 MC: CPR-46ACJ, double conversion, 2 IF's, 3 lighthouses, brand new with ALL 12 TUBES!
YOUR CHOICE EACH.....$9.95 **BOTH FOR ONLY.....$17.95**

RE-TUNE 30 W. TV XMTR TO 220 OR 440:

or start your own TV station! Four 8025 UHF triodes, two as 250-385 mc P-P osc. drive two as PA which is grid-mod. by 3-tube video, and plate-mod. by 3-tube, sync. amplifiers. A super buy. New! With all tubes, schematic and instructions to 420. Only..... **$15.75**

THE BEST, HANDIEST CARBON MIKE

RS-38. Used in CAA towers. Fits in the palm of your hand! Has press-to-talk button on top, and a springy curled cord only 1 ft. long which stretches to 4½ ft. With standard PL-68 3-circuit plug at other end. Like new and guaranteed. Terrific buy at only..... **$2.50**

$11.90 PER GALLON

With 2 new RK-65 tubes. Each is 720 W. input, 510 W. output, 6 W. grid drive, and good thru 2 meters. With data sheet. Per Pair..... **$11.90**

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VHF *[from page 86]*

Council Bluffs, Iowa Ed (KØCZD) comments on old times and high power:

"Before I go any further (I've gone anywhere yet?), let me refresh your memory. In the wee hours of the morning of a heat wave in August of 1949 (or was it '48), you were putting the first loud signal into New Jersey and New York from W8UKS. Among others, you worked W2QNZ who informed you some W1's in southern Connecticut were looking for you. Shortly thereafter, QNZ called again to say he had a W1 on the hook, and then began VFOing from your frequency to the W1's to spot things. Shortly thereafter the first, to my knowledge, Ohio-Connecticut QSO on two meters came about. Do I remember correctly? It seems a little hazy, now. I was W2QNZ.

"Now after being W4FFW (Fine Fancy Women) and W9QNZ, I am KØCZD and a design engineer for World Radio. Some time ago I designed an inexpensive but still high-performance 6-meter converter, and when I moved out here it was one of the items selected to my surprise for WRL production.

"On W1RUD's 10 KW on VHF—let's face the fact that the vast majority of VHF operators simply could not afford such equipment. However, the information to be derived from operation of such stations could be expected to be of great value. Therefore, it would seem to me that issuance of a special license, perhaps for operation on specific frequency, or with a, say, 50 kc sub-band in which such operation could take place, would serve to keep such operation under the close control it should have. Such power would not be for casual local ragchews, obviously, but would in large part be used for special schedules on pre-arranged spot frequencies by serious experimenters. Under those conditions, special licenses and restricted frequencies would not cause undue difficulties in such experimentation. Under such conditions, I'd be very much for the idea. If such power were available to all licensees (even if Novices were, of course, accepted), I'd be against the proposal. This is not the sort of a rig for a newcomer to radio to get his hands on. Mishandled, it could cause a fantastic amount of QRM, not to mention the potential danger of a rig running 10,000 volts at 1000 mils to the final (pardon the pun).

"Also, hearsay has it that there are about a dozen or more stations on two in the Omaha, Nebraska, area (just across the river), and I know of at least two in six meters, one of whom is hearing stations 110 or more miles away on a WRL converter and a two element beam." *Good comments on the high power question, Ed. The 6 meter WRL converter is working real good at W1HOY. As a matter of record, it was used in my first attempt to bounce six-meter signals from the moon on July 17, 1956. As noted elsewhere, the attempt was successful.*

Shawmut, Alabama Harold (W4VUO) comments on activity in his area:

"Activity has been at a low ebb since November. There is only one local active closer than 90 miles away. Had a jinx come riding by in early December and down toppled the 16 element beam, but have just erected a 32 element UHF resonator beam so that my total should begin to show an increase.

"Big beams seem to be the vogue here (as compared to the usual twin 5 beams), W4EQM has erected a 24 element 70 feet high; W4BGC has a UHF 32 beam, 50 feet high. Southern Alabama should be represented amply when the openings start occurring again. I hear by W4FEC that W4CAH and W4CNV Auburn, Alabama will be on two in a week or so. Equipment now ready. (W4FEC—12 element beam, 85 feet high.)" *Send us more news on the results you get with the new beam, Harold. How about a photo of the 417 pre-amp.*

[Continued on page 127]

New Callbook

This is to remind you that the new Fall edition of the Radio Amateurs Handbook will be available Sept. 15th.



Bill Orr has been at it again!

CQ proudly announces a

completely

NEW MOBILE HANDBOOK

Mobiling 1957 . . . the *latest* dope
Over one full year in the writing
Every chapter is worth the price of the book
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Eimac's line of 16 air sockets provides these advantages for nearly all Eimac multi-grid and klystron tube types. Each is the best for its own specific function. And each is an original Eimac custom design.

Among these 16 is the SK-630. Developed for use with Eimac's 4X150A, 4X150D, 4X250B, 4X250F, and 4W300B in tropical atmospheres, it employs an encapsulated screen-to-cathode bypass capacitor which, in combination with shielded circuits, permits stable high gain operation up to the tube's highest useful frequency.

Eimac air system sockets chimneys are also available.

Eimac EITEL-McCULLOUGH, INC.
SAN BRUNO, CALIFORNIA
The World's Largest Manufacturer of Transmitting Tubes

LX Expedition [*from page 63*]

another one. In the 48 hour period, our final tally showed later, our group, including the operators who joined us on Saturday and Sunday, made 428 100% QSO's, and hooked up with 34 other stations which were subsequently lost in the QRM. Except for VK and ZL, we managed to work nearly the whole world with our 30 watts. Our little rig did a fine job on 80, 40, 20, and 15, and several times we got 589 from W6's.

Saturday afternoon I was relieved by ON4CC, the first of the later group to arrive. We had flown the Belgian flag from our HQ to show the way, and he spotted it without difficulty. Later, the others began to drift in. ON4DE and ON4RB, our 144mc. specialists, came in separate cars, mobiling en route. They had taken their time on the way, and did a lot of operating in order to give the "Worked All Belgian Provinces" VHF enthusiasts a chance to fill their logs. When they got into Luxembourg they tried to work PAØ and G, but conditions were too poor and nothing came of it. ON4LJ arrived in time to relieve ON4CC, and continued to fill the log during his stint. On Sunday ON4TQ completed our roster, having piloted a little motorcycle all the way from Antwerp, seven hours away, through an icy, stormy night.

And so, at last, our operating time expired, and the ON4/LX expedition officially came to an end. But before beginning the frightful and anti-climactic task of packing our gear back to the cars and hitting the road for home, we sat around in one big, happy, exhausted group, and discussed our impressions. They boil down to this: the expedition was a full success, despite the conditions of rain, cold, and physical discomfort, thanks to the individual participants, to our little rig, to ham radio in general, and most of all to a gallant padre, the little Luxembourg priest named Hostert. For ourselves we thank him, and for all the hams who

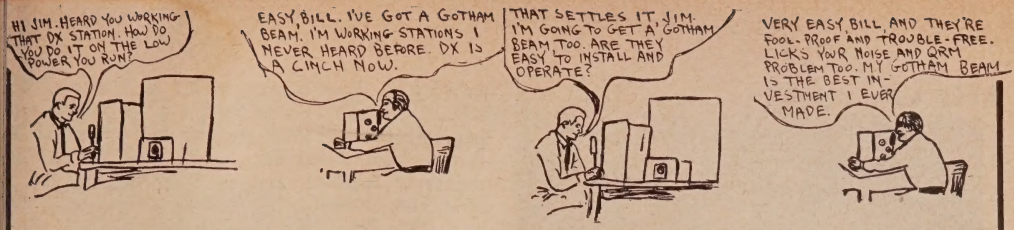
[*Continued on page 104*]

He wants to be first in line for a new

HAMMARLUND

HQ- (Shhhhh—censored till September)





Study these specifications—compare them—and you too will agree, along with thousands of hams, that GOTHAM beams are best!

TYPE OF BEAM. All Gotham beams are of the full half-wave plumber's delight type; i.e., all metal and grounded at the center. No wood, tuning stubs, baluns, coils, or any other devices are used.

GAIN. Gotham beams give the maximum gain obtainable. Our 2-element beams give a power gain of four (equivalent to 6 db.); our 3-element beams give a power gain of seven (8.1 db.); and our 4-element beams give a power gain of nine (9.6 db.)

FRONT-TO-BACK RATIO. We guarantee a minimum F/B Ratio of 19 db. for any of our 2-element beams, 29 db. for any of our 3-element beams; 35 db. for 4-element beams.

MATCHING. Matching of the transmission line to the beam is extremely simple and quick. Everything is furnished and the matching is automatic. No electronic equipment or measuring devices are required.

ASSEMBLY AND INSTALLATION. No special tools are required for assembly and installation. Entire job can be done by one man in less than an hour. Full instructions are included with each beam.

MAST. Any Gotham beam can be mounted on a simple pipe mast. Diameter of the pipe should be between ¾" and 1⅝".

STANDING WAVE RATIO. A very low SWR of approximately 1.5 to 1 will result from following the instruction sheet, depending on the height above ground and the surrounding area. If an SWR indicator is available, Gotham beams can be quickly and easily adjusted to 1.1.

STANDARD AND DELUXE BEAMS. Standard beams in the 6, 10 and 15 meter bands use ⅝" and ¾" tubing elements; the deluxe models for these bands use ⅞" and 1". In 20 meter beams, the standard has a single boom, while the deluxe uses twin booms.

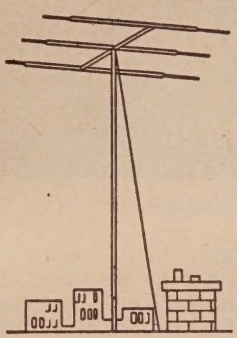
WHAT WILL A GOTHAM BEAM DO? A Gotham beam will amplify the transmitted and received signal tremendously and will greatly reduce noise and QRM.

NEW VERTICAL ANTENNAS

ENGINEERED VERTICAL ANTENNAS for 40 meters, 80 meters, 160 meters. Gotham proudly announces three vertical antennas for unsurpassed performance on 40 meters, 80 meters, and 160 meters. Each antenna is absolutely complete, canb e assembled in less than two minutes and requires no special tools or electronic instruments for adjustmen and operation. Radiation is omni-directional, with maximum radiation at the very low angles necessary for DX operation. These three vertical antennas have been developed over a period of three years in respons to requests by hams for efficient, fool-proof, small-space, low-cost antennas for 40, 80, and 160 meters. Two 12 foot lengths of tubing and loading coil in each vertical antenna. Literature available.

V40 vertical for 40, 20, 15 and 10M.....$14.95
V80 vertical for 80, 40, 20, 15, and 10 M.....$16.95
#V160 vertical for 160, 80, 40, 20 15 and 10 M.....$18.95

HOW TO ORDER: Send coupon with check or money order directly to GOTHAM or visit your local distributor. Immediate shipment by Railway Express, charges collect. Foreign orders accepted. Some leading distributors who handle GOTHAM beams: Offenbach & Reimus, Curie, M. N. Duffy, Alltronic, Purchase Radio, Lew Bonn Co., Henry Radio, Evans, Gib's Ham Gear, Hobe's Radio, Western Electronics, Harris Radio, Capitol Radio, Kinkade, Johannsen, W H Edwards Co., World Radio Labs, Graham Electronics, Geo. D. Barbey Co., Hudson Radio, Selectronic, Radio Electric Service, Ken-El-Es Radio, NRM Wholesale Radio.



This Full Size Gotham Cost Only $21.95 And Brought In 87 Foreign Countries, All Continents And 30 Zones On 35 Watts!

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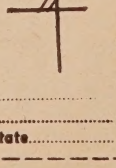
Enclosed find check or money-order for:

2 METER BEAMS			
☐ Deluxe 6-Element	$9.95	☐ 12-El	$16.95
6 METER BEAMS			
☐ Std. 3-El Gamma match	12.95	☐ T match	14.95
☐ Deluxe 3-El Gamma match	21.95	☐ T match	24.95
☐ Std. 4-El Gamma match	16.95	☐ T match	19.95
☐ Deluxe 4-El Gamma match	25.95	☐ T match	28.95
10 METER BEAMS			
☐ Std. 2-El Gamma match	11.95	☐ T match	14.95
☐ Deluxe 2-El Gamma match	18 95	☐ T match	21.95
☐ Std. 3-El Gamma match	16.95	☐ T match	18 95
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☐ Deluxe 4-El Gamma match	27.95	☐ T match	30.95
15 METER BEAMS			
☐ Std. 2-El Gamma match	19.95	☐ T match	22.95
☐ Deluxe 2-El Gamma match	29.95	☐ T match	32.95
☐ Std. 3-El Gamma match	26.95	☐ T match	29.95
☐ Deluxe 3-El Gamma match	36.95	☐ T match	39.95
20 METER BEAMS			
☐ Std. 2-El Gamma match	21.95	☐ T match	24.95
☐ Deluxe 2-El Gamma match	31.95	☐ T match	34.95
☐ Std. 3-El Gamma match	34 95	☐ T match	37.95
☐ Deluxe 3-El Gamma match	46.95	☐ T match	49.95

(Note: Gamma-match beams use 52 or 72 ohm coax. T-match beams use 300 ohm line.)

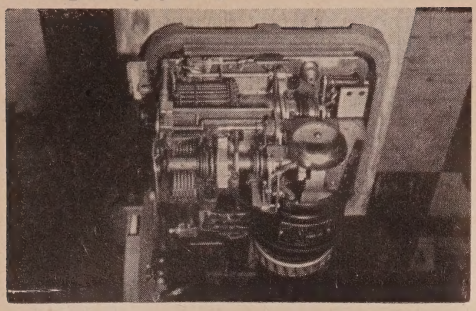
NEW! RUGGEDIZED HI-GAIN 6, 10, 15 METER BEAMS

Each has a TWIN boom, extra heavy beam mount castings extra hardware and everything needed. Guaranteed high gain, simple installation and all-weather resistant. For 52, 72 or 300 ohm transmission line. Specify which transmission line you will use.



☐ Beam #R6 (6 Meters, 4-El).....$38.95
☐ Beam #R10 (10 Meters, 4-El).... 40.95
☐ Beam #R15 (15 Meters, 3-El)..... 49.95

Name .....
Address .....
City .....Zone.....State.....



Model 401-A, Cover Removed

pear. This is the lower limit. Do the same at the other end of the scale to find the upper limit. The correct setting is about one-third of the total range above the lower limit. For example, if the limits are 20 and 70, the total range is 50. One-third of 50 is about 17. 20 plus 17 then equals 37, the correct setting.

Another, and more modern, narrow-tape printer that has come into amateur hands, but in lesser quantity, is the Model 14, sometimes supplied with a keyboard for transmitting. We don't have the space to go into detail on this machine. Suffice to say it is a "single-magnet" machine with a type basket and a ribbon for printing. Some of these machines are being rebuilt into Model 14 Typing Reperforators (for wide, chadless, tape) by a few amateur machine specialists; however, this is no small job, and it is comparatively expensive.

This concludes the section on tape equipment. At this point I would like to express my thanks to Elston Swanson, W2PEE, for supplying the technical information on the 401-A. There are undoubtedly other types of machines, other than those we have described, in ham shacks these days. There just isn't space enough to cover them all, so we have tried to detail those that have appeared in reasonable quantity. Next month we will discuss the care and feeding of polar relays.

Across the Nation

The accompanying station photo is that of W3KYR, the amateur radio station of the St. Mary's Boys' Club of St. Mary's, Pennsylvania. The transmitter ends up with a pair of 813's in parallel. The receiver is a BC-348-P, and the TU is a combination of ideas from W9TCJ, W6OWP, and W3LGK. The printer is a Model 26. Fred Wise, W3LGK, constructed and owns all the gear except the receiver. Permission was granted Fred, by W3NDE, executive director of the club, to use the facilities of the club in order to keep the station active. The St. Mary's Boys' Club was the first club in the Federation of Boys' Clubs to own and maintain an amateur radio station, and also was the first to be set up for RTTY. Thanks go to Fred and W6AEE (*RTTY*, Feb. '55) for the picture and the dope.

W1NCL, West Haven, Conn. is a new RTTY station on 3620 kc.—with 1 kw., no less! Nice beginning! K2GTY is another newcomer on 2-meters from Bronxville, N. Y. W4EBH has his converter working and is now looking for a Model 26. W6BSC wants to buy a tape perforator and TD. W5ZHV is operating K2USA, Fort Monmouth, N. J.

W2TKO announces the activation of the Niagara Frontier RTTY Net on 147.5 Mc., autostart. Members are W2ALR, K2EPV, W2FAN, W2IUF, W2RUI, W2SSS, W2TKO, W2VLL, and W2ZOC. Roy has a new 75-A4 for FSK and has built an xtal-controlled receiver for 2-meters that only draws 30 watts from the line.

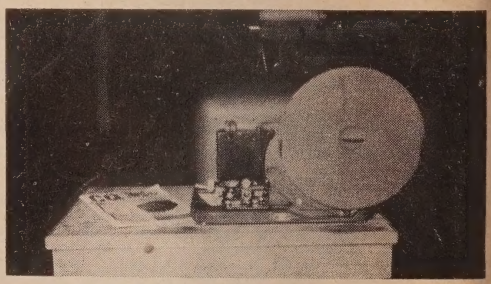
Comments

One of the New York City 2-meter RTTYers has a new wrinkle: unattended automatic tape transmission on the net channel. He starts up his tape transmitter by his autostart clock on the hour at certain pre-set times. One character then turns on the filaments and another the plate, after a short time interval. The tape then keys the AFSK oscillator with the message previously punched in the tape. Very ingenious. Just one thing wrong: It ain't legal!

Chicago Meeting

Have you dropped Joe Juel, W9BGC, (120 Lavergne Ave., North Lake, Ill.) a card telling him that you would like another RTTY Meeting in Chicago this coming October in connection with the National Electronics Conference?

73, Byron, W2JTP



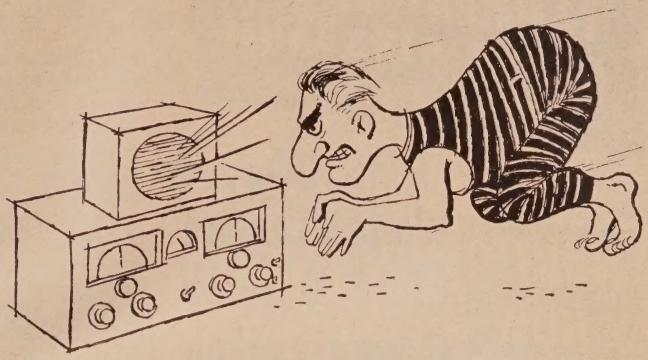
Model 401-A Narrow-Tape Teleprinter

Washington, D. C.

National Capital Area Hamfest
Sunday, October 7, 1956, 12 n. to 9 p.m.
Gaithersburg Fair Grounds just off old Route 240, Gaithersburg, Maryland.
Prizes, programs for ladies and children, auction, rummage sale, exhibits of new equipment, free soda pop for the kids, contests.
Plenty of free parking, plenty of shelter in case of rain. Stations on 75, 10, 6 & 2 for mobile contact. Picnic tables galore and for those who don't bring their own food a special caterer will sell food at reasonable prices.
Sponsored this year by Washington Mobile Radio Club.

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GET A MULTIPHASE MODEL GC-1
GATED COMPRESSION AMPLIFIER*

Now – it's no longer necessary to "ride" the gain control in SSB–AM–CW round tables in an effort to copy the "barefoot" rigs along with the KW rock crushers! Merely set the Sensitivity control so that the weakest signal in the round table is Q5 and presto – no more blasting.

The GC–1 is a complete audio output system. With its novel Gated Audio AVC circuit, changes in level of approximately 40 db. produce less than 3 db. variation in output. The unit may be connected between the receiver or Sideband Slicer output and the speaker voice coil – it's that simple.

Thousands of GATED COMPRESSION units are in daily use by Deaf Training schools throughout the world to prevent painful "blasting" and to provide relaxed listening pleasure.

Get your MULTIPHASE GC–1 now! Then sit back – relax – enjoy ham radio and pity those who are still diving for the gain control.

Price . . . . . Wired $59.50, Kit $49.50

OTHER MULTIPHASE PRODUCTS

Model 600L – Broad Band Linear Amplifier			$495.00
Model 20A – 20 watt Band Switching Exciter	$249.50	Kit	$199.50
Model 10B – 10 watt Multiband Exciter	$179.50	Kit	$129.50
Model B – Slicer & Q Multiplier	$ 99.50	Kit	$ 69.50
Model A – Slicer, less Q Multiplier	$ 74.50	Kit	$ 49.50
Model AQ – Q Multiplier for Model A Slicer	$ 29.50	Kit	$ 22.50
Model DQ – Desk Model Q Multiplier	$ 29.50	Kit	$ 22.50
Model 458K – Conversion Kit for 160 thru 15 Meters			$ 15.00
Model 458 CP – Deluxe Case & Panel for 458 VFO			$ 10.00
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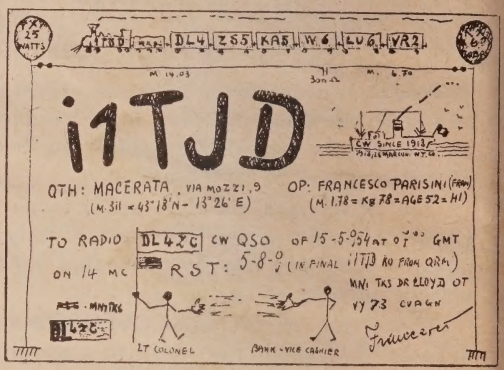
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25,000 QSL's

[*from page 23*]

Any active amateur station receives cards from short wave listeners (SWL's). The author has always answered such cards providing it is certain that he was on the air at that time. In this connection all SWL would be well advised to include date, time, frequency, and information as to station being worked or called during QSO described.

The date used on QSL cards is a matter of frequent confusion and can be easily corrected if all amateurs of the world would use a common system. For example, cards are frequently received with a date such as 6-8-56. This could be 6 Aug 56 or 8 June 56. It is highly recommended that the date be always written with the day first, the month next, and the year last. It



The Most Effort QSL

helps to spell out the month rather than use a number for the month. This system of writing dates is universal in the Armed Forces of the United States and is used in the majority of the countries of Europe.

The time can also be confusing on QSL's sent to or from foreign countries. All amateurs working DX receive a large number of QSLs with time listed in GMT. It is recommended that stations logs and QSL's be kept in GMT if you intend to work much DX.

As QSL's are used as required proof when applying for many operating awards it is desirable that they be completely and legibly filled out in ink or by typewriter. The minimum information required on such QSL's is the call, date, time, frequency and report (RST or RS) of signals received. It is advisable to sign or initial all outgoing QSL's as a means of authentication.

Remember that your QSL may mean much to the other ham. Try to QSL to all amateurs requesting one! Always answer all QSL's received! ■

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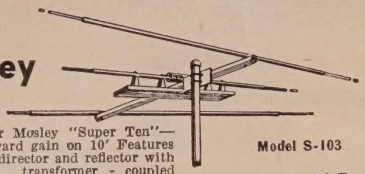
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Mosley



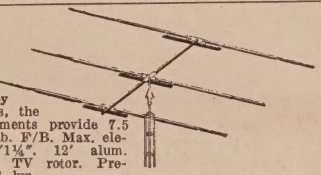
The popular Mosley "Super Ten"—7.9 cb. forward gain on 10' Features full length director and reflector with compensated transformer - coupled driven element. Weighs just 20 lbs. but built to take it! Pre-tuned and color-coded for quick assembly. Model S-103 Ham Net **$39.50**

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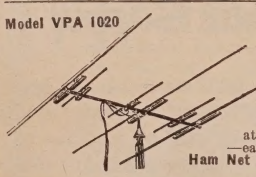
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LX-Expedition [*from page 57*]

contacted us we thank him also, and offer up in his honor three rousing cheers.

We plan other expeditions in Europe. We can't say where or when, due to the many problems and licensing difficulties sure to be encountered. But we'll do it again, someplace, sometime, perhaps with better equipment. And when we do, we'll work *you*, for sure. ■

Contests [*from page 57*]

tions as possible. Send your logs to Contest Chairman, Gordy Webster, VE2BB, 69 Pine Beach Blvd., Dorval, Quebec.

CQ W.W. DX

Same rules as last year plus—addition of 27 mc as a separate band. Addition of a Novice division. Minimum operating time increased to 8 hours. And three new Special Awards. See August CQ for complete details. Still time to write to CQ for rules and contest logs.

See page 94 for more info. ■

Illinois

On Sunday, September 16, the Egyptian-St. Louis Annual Hamboree and picnic will be held at the Egyptian Radio Club Grounds, one block south of U. S. Highway 66 on the East side of Chain of Rocks canal (just across the Mississippi River from North St. Louis).

There will be contests of all kinds from code speed to egg throwing. As usual there will be entertainment for the youngsters by the nationally known clown and frogman, Charlie "Diver" Delps, W9QMG. Other notables will be A.R.R.L. officials and Earl "Lid" Linder, WØDZG, Editor of Podunk News.

On display, and manned, will be the new Emergency Communications truck of the U. S. Coast Guard.

Prizes will be given for attendance and for the various contests.

Traffic get-togethers of Illinois and Missouri State nets and SSB meetings will be held during the day.

Food and drink will be served on the grounds.

Come early and stay late . . . Mobiles work W9AIU on 3940, 3990 and 29640 kcs. There will be no charge for admission.

For more information write WØQDF, who, as usual, is chairman of activities.



He saw the price

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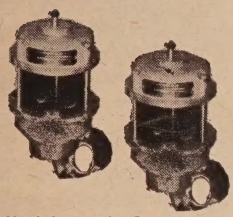
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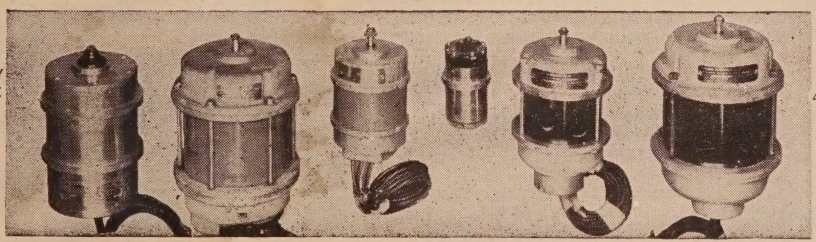
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110 V. 60 CYCLE UNITS

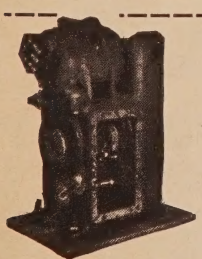
Size & Type	Approx. Weight (Lbs.)	Approx. Length (Inches)	Approx. Diameter (Inches)	Price Used	Price New (Cases may be slightly nicked)
5F	5	6.0-6.8	3.4-3.6	$5.00	$10.00
5G	5	6.0-6.8	3.4-3.6	5.00	10.00
5DG	5	6.0-6.8	3.4-3.6	5.00	10.00
5CT	5	6.0-6.8	3.4-3.6	5.00	10.00
6F	8	6.4-7.5	4.5	7.50	15.00
6G	8	6.4-7.5	4.5	7.50	15.00
6DG	8	6.4-7.5	4.5	7.50	15.00
6CT	8	6.4-7.5	4.5	7.50	15.00
7G	18	8.9-9.2	5.8	10.00	20.00
7DG	18	8.9-9.2	5.8	10.00	20.00

110 V. 400 CYCLE UNITS

Size & Type	Approx. Weight (Lbs.)	Approx. Length (Inches)	Approx. Diameter (Inches)	Price Used	Price New (Cases may be slightly (nicked)
5F	5	6.0-6.8	3.4-3.6	$3.50	$7.50
5G	5	6.0-6.8	3.4-3.6	3.50	7.50
5DG	5	6.0-6.8	3.4-3.6	3.50	7.50

CT—Control Transformer; D—Differential Motor; DG—Differential Generator; F—Motor (Follower); G—Generator.

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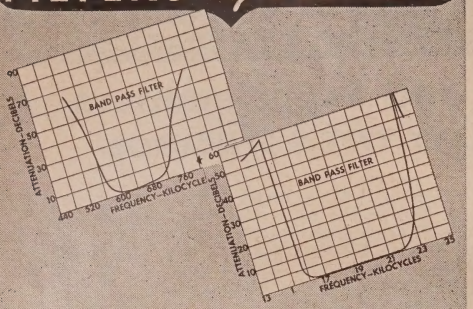
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DIRECTIONAL WHIPS

[*from page 45*]

in Niagara Falls and back, I had an almost perfect 20-mile north-south route. My best contacts were to the north-northeast and south-southwest.

To other mobileers, I recommend using front and rear lobes, particularly on the higher-frequency bands of 10, 15 and 20. If possible, head your car in the general direction of the station being worked. A compass mounted in the car will be a great help.

Signal Intensities

Note received signal intensities when turning your car. You should transmit well in the directions from which you hear strong signals.

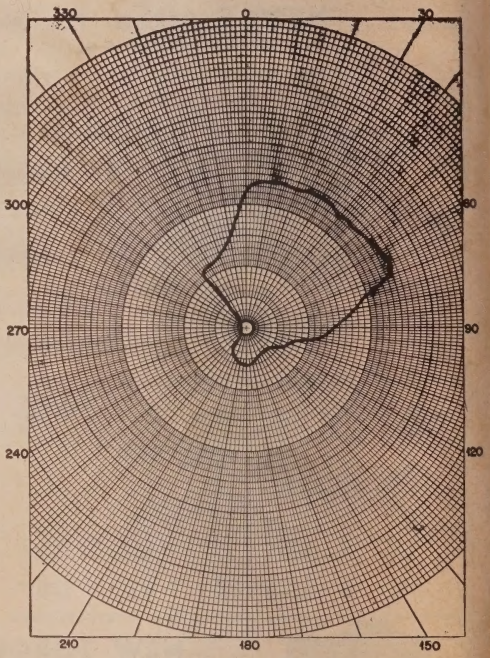


Fig. 3

Avoid bumper mounting of your mobile whip if you can. Side mounting also is discouraged. Both bumper and side mountings are situated badly in respect to noise fields. Shoulder mounting is efficient and is recommended. Top mounting is fine, but it presents some problems, especially in areas of many overhead traffic lights.

In any case, more fun to you from your mobile beam! ■

Reference Jan. 39. Proceedings of the I.R.E.

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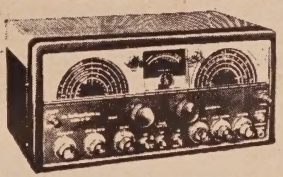
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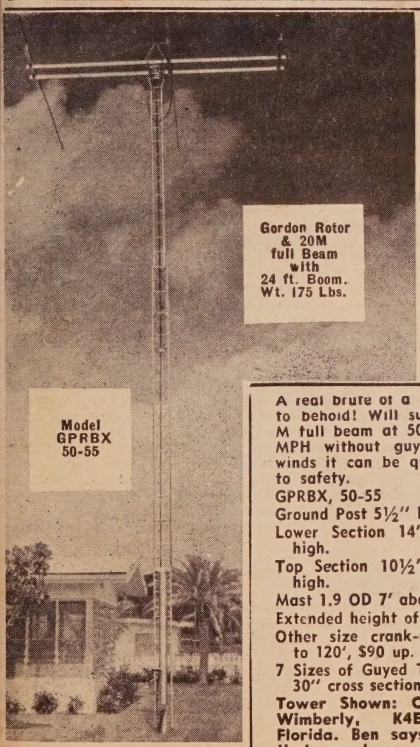
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Ground Post 5½" Dia. 10' high.
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Mast 1.9 OD 7' above tower.
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Honest Wayne Green, W2NSD, furtive editor of *CQ* claims that in interviews with 100 owners of the fabulous *CQ* World Globe that 19% drink Piels. All 100% thought their World Globe was terrific.

This vinyl plastic 18" globe now has a new mount which works either on a table or hanging from the wall. Why not ignore this page and go out and get one from your local world globe supplier for the low low price of $24.95? Why not indeed! The main reason is that while they last (and they will last a long time) you can get this DX aide from friendly *CQ* for only $19.95. Wow! In addition to the tears of gratitude which will stain your package you will be forced to accept a one year subscription to *CQ*, new or renewal. Pity.

At least you will then be able to read in the magazine how the ill gotten profit (very slight, really) from this transaction is squandered on overpaying authors to send us manuscripts.

To save postage on this deal we ship the globe flat and let you blow it up with your own hot breath. If you are for any psychotic reason unsatisfied with this deal send the globe back with a nasty letter and we will with a minimum of good grace return your money.

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letters [*from page 16*]

Then back to Trinidad where VP4LW was at the airport again. I stayed at the Piarco airport this time as I had to be off early the following morning to Jamaica via Caracas, Maracaibo and Barranquilla. YV4FL was to meet me at Caracas, but after phoning his office, I learned he was still on vacation in the States.



VP9BM

Arriving in Kingston I was greeted by Ivan, VP5AK, and Dave, VP5BR. That evening I had dinner with VP5BR and his XYL, and was off again the following morning for the 120-mile auto ride across the island to Montego Bay. Here I hoped to meet VP5AA, but he was tied up with his business, so had to content myself swimming at Doctor's Cave. After 2 days I left for the journey home via Avainca, which I consider as the finest and safest airline in the Americas.

It was a swell Holiday.

Charles, W2OHF
East Orange, N. J.

Rescue

Gentlemen:

From hunting transmitters to hunting trains is quite a jump; but not for Alabama Emergency Net "P," which meets daily at 6 PM CST on 3955 kc.

When Train Number 20 of the Southern Railway out of Mobile was overdue Sunday morning, July 8th; officials, knowing of flood conditions along the route, sent out a call for amateur radio operators to aid in finding it. K4CEM, a railroad employee, telephoned W4BFX from the depot at 0900 CST and W4BFX immediately went on the air alerting the members of the AEN "P." Net manager, K4AOZ, activated the net and took charge as net control station. W4OBV-mobile was in Marion over the weekend and took the call, telephoning the Marion police department; who in turn relayed to the police in Jackson, Alabama, and alerted the highway patrol. It was established that Number 20 was missing somewhere between Jackson and the town of Suggsville. Meanwhile, W4GJW heard the alert on the Alabama Emergency Net Frequency and switched over to 40 meters to catch a station he had been working in Evergreen, W4FDZ. W4FDZ called the Evergreen police who also relayed the call into the Jackson police.

Within 45 minutes of the time the request was given to K4CEM, a Jackson police squad car found the stranded train trapped between two washouts and unable to move. The information was radioed back through police and amateur channels to the Southern Railway officials. The fine cooperation of hams and local police and railroad officials thus quickly allayed fears of the railroad and relatives of passengers as to the train's safety. A credit to the organization of the Alabama Emergency Net and the quick thinking of its members. Stations assisting were: K4's AOZ and CEM; W4's PXQ, HKK, GJW, BFX, OBV, FDZ and W5ZLP.

Capt. Ross A. Sheldon, K4HKD

Clubs

Dear W2NSD,

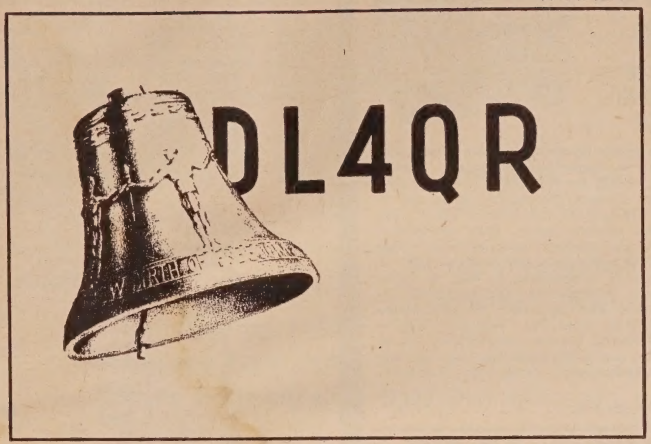
I am the editor of the newssheet of the Johnson County Radio Amateurs' Club, Inc. Our Club call is WØERH and as of yet we have not decided on a name for our new paper. If any other clubs would like to get on our exchange mailing list we would be most happy to hear from them at our address of 5845 Roeland Drive, Mission, Kansas.

Bill Calvin, KØEOR

[*Continued on page 110*]

QSL Contest

WINNER

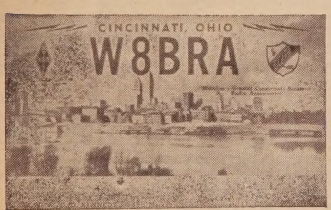


Another DX winner! Below are some of the best losers this month. How about that card of yours? We need lots of losers. Who knows, maybe you'll win the two year subscription that goes to the winner. If your card is terrific you have a 90% chance of winning. If it is just excellent the odds go to 30%. But then, how do you know what our impartial judges will like?

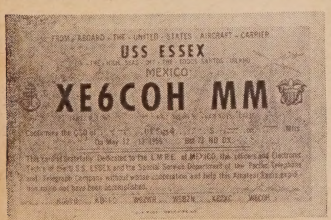


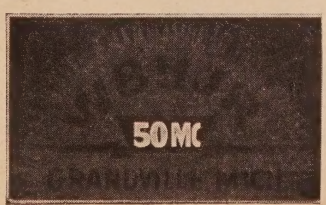


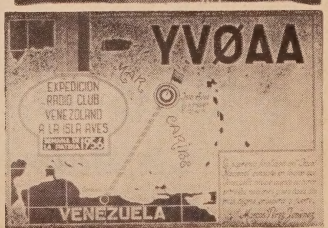










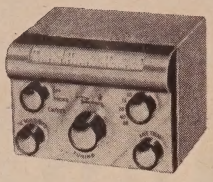


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First and only transistorized amateur band converter available! World's lightest — weighs only 30 ounces! World's smallest — only 4¾ by 3¼ by 4⅛ inches! Instantly connects to any receiver — home, mobile car, boat, etc. — to convert it to AM, CW and SSB reception on the 80, 40, 20, 15 and 10 meter amateur bands. Only connections are to an antenna and the receiver's antenna input. When used with a receiver of reasonable sensitivity at 1200 to 1300 Kc, performance is comparable to that of bulky vacuum-tube converters. A simplified "Q" multiplier circuit improves sensitivity and selectivity for AM phone operation. Self-powered by three tiny "Penlight" cells — does not use receiver power. Current drain of only 450 to 600 microamperes gives cells a life expectancy approaching shelf life. Transistor complement: 1—SB-100, 1—2N172, 1—CK 706 diode.

ATC-1, complete with batteries..... **$79.50**

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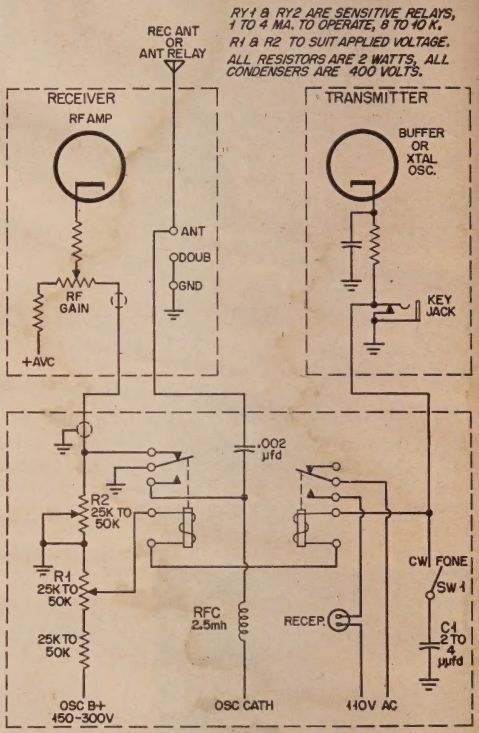
CQ Magazine

67 West 44 St. New York 36, N. Y.

[*from page 108*]

Dear OM:

Enclosed is a schematic of an automatic delay circuit used for C.W. It has provisions for break-in, turning off the receiver, monitoring the signal, changing the antenna from transmit to receive and automatic control of the VFO. Except for the relays, most of the parts were taken from the junk box and should provide no problem to the average ham. W1AFN has just the relay, a DPDT at a buck seventy five a throw. Most of the surplus 1 to 4 ma. relays are only SPDT so two will need to be used if you don't have a double throw type and don't want to buy it. The relays must be low current types or the time delay (hold in) of the relays will cause sparking at the key as the circuit "makes" due to the fact that *C1* will have to be too big to compensate for the larger current relay.



R1 can be set to hold in at normal keying speed from 8 to 30 wpm. This works very well on a *Viking* transmitter and VFO. The unit will work from the key jack in the front for phone operation. *SW1* should be opened to stop the holding effect of the relays for phone operation.

With a 8 to 10K ohm relay operating at 12 to 18 volts, keying current was approximately 10 to 15 ma. on the *Viking*. Caution: 10 to 50 volts d.c. will appear across the key and from key to ground depending on the setting of *R1*. A key click filter might be necessary. Keying looks clean on a scope and four others here in Dayton are now using this device on their *Vikings* and *Rangers* and sure like the ease of operation this unit gives. . . .

H. V. Wolfe, W8LAX
Dayton, Ohio

Catalina Island

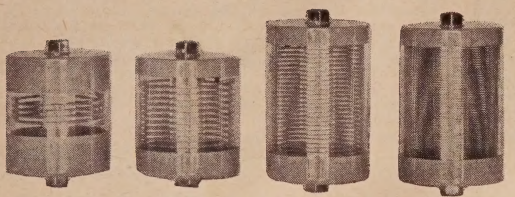
Dear Wayne:

The XYL and I live on Catalina Island the year around, in my capacity of Radio engineer at the KBIG transmitter. Our location on this island 23 miles off the coast of So. Calif. is for technical reasons; by getting a clean sweep of the whole California coastline, we lay down a signal comparable to 50,000 watts.

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Pat. Pend.

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- The only genuine hermetically sealed antenna loading coils.
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For operating on 80, 40, 20, 15, 10, 6 and 2 meters—on either fundamentals or harmonics.

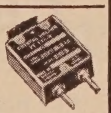
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FT-241A RANGE 370 KC –538 KC



FT-171B RANGE 2030 KC –3995 KC



CR-1A RANGE 5910 KC –7930 KC

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370	393	415	487	509	533	400	462
372	394	416	488	511	534	440	463
374	395	418	490	512	536	441	464
375	396	419	491	513	537	442	465
376	397	420	492	514	538	444	466
377	398	422	493	515	540	445	469
379	401	424	494	516		446	470
380	402	425	495	518		447	472
381	403	426	496	519		448	473
383	404	427	497	520		450	474
384	405	431	498	522		451	475
385	406	433	501	523		452	476
386	407	435	502	525		453	477
387	408	436	503	526		455	479
388	409	481	504	527		457	480
390	411	483	506	529		458	
391	412	484	507	530		459	
392	414	485	508	531		461	

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CR-1A SCR 522-EE Pin, ½" SP

5910	7380				
6370	7480				
6450	7580				
6497	7810				
6522	7930				
6547					
6610					
7350					

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2030	2220	2360	3202		
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2065	2260	2415	3237		
2082	2282	2435	3250		
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2125	2300	2532	3570		
2145	2305	2545	3955		
2155	2320	2557	3995		

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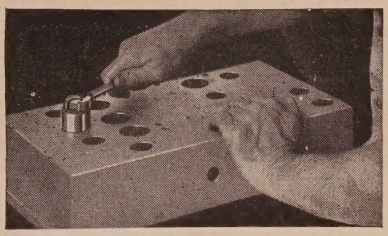
4035	5706	6306	7473	7750	8690	
4080	5740	6325	7475	7766		
4165	5750	6340	7500	7773		
4190	5773	6350	7506	7775		
4280	5775	6373	7520	7800		
4340	5780	6375	7525	7806		
4397	5806	6400	7540	7825		
4445	5840	6406	7550	7840		
4490	5852	6425	7573	7841		
4495	5873	6673	7575	7850		
4810	5875	6675	7582	7873		
4852	5880	6700	7600	7875		
4930	5892	6706	7606	7900		
4950	5906	6725	7625	7906		
5030	5925	6750	7640	7925		
5327	5940	6775	7641	7940		
5360	5955	6800	7650	7950		
5385	5973	6825	7660	7975		
5397	6206	6850	7673	8250		
5437	6225	6875	7675	8273		
5485	6240	6900	7700	8300		
5500	6250	6925	7706	8310		
5660	6273	6950	7710	8316		
5675	6275	6975	7725	8320		
5700	6300	7450	7740	8630		

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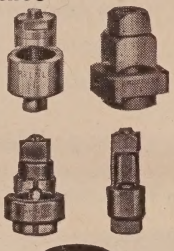
3735	6185	6625	8173	8525	
3990	6200	6640	8175	8550	
6025	6450	6650	8200	8575	
6040	6473	7000	8225	8600	
6042	6475	7025	8275	8625	
6073	6500	7075	8280	8650	
6075	6506	7125	8350	8680	
6100	6525	7150	8375	8690	
6125	6550	7300	8400	8700	
6140	6573	7306	8425	8733	
6150	6575	7425	8450		
6173	6600	7440	8475		
6175	6606		8500		

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This location is amazing, everything can be heard, lots of ZL and VK on 75 mtrs. On the higher freq. bands, everything is S9 plus. I've been operating on 75 fone with 20 watts input, and even in the daytime, I work into the San Francisco area with S8 and 9 reports.

I was first licensed as W7BDD in the state of Washington (1928, I believe it was).

Our Island is very interesting, we have wild Russian Boar to hunt, also there are quite a few Buffalo, real American Buffalo, on the Island. Wild Catalina Goat also are plentiful, they can be seen on most any hillside. Quail are so thick that you could shut your eyes and hit any number. We also have deer.

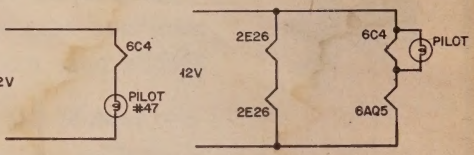
Our Transmitter building is on top of the mountains about 1600 feet up above the only city on the Island, Avalon. Right now, as I look out the window, I can see the Palos Verdes Mountains on the mainland, as well as the city of Long Beach.

Mel York, K6DBI

Unequal series filament problem

Dear Sir:

Having recently purchased a new car with a 12 volt system I was confronted with the problem of converting my home built rig from six volt filament operation.



If a pilot lite of the proper current rating is placed across one of two unequal current rating tubes connected in series the load will balance out. Shown in the diagram is a 44 pilot lamp drawing about .25 amp across a 6C4 which is in turn seriesed with a 6AQ5. A 47 lamp in series with a 6C4 will work well across a 12 V source just as well.

Fred Nazar, W8RNA

PUZZLER ANSWER

Dear Wayne,

That short, sneaky little paragraph on page 16 was a real stopper. All I can say about the last remark is that you had better print the answer or somebody is gonna be sore.

After a couple of hours I came up with an answer of 1,674½ years for Ann's age but discounted the answer because of the fraction. Eventually I decided it wasn't a whole number anyway and got 16½ years as my final answer.

Which is better, *Bayer* or *Anacin?*

Gilbert Boelke, W2EUP

Anacid is better because it is made of ingredients, like a doctor's prescription—ED.



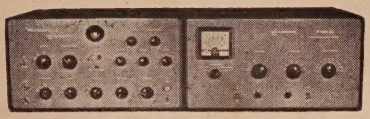
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Companion Unit



"Phasemaster - II"

the ultimate for AM — PM — CW and SSB — 75 W PEP output — completely bandswitched 160 thru 10M — wide pi network output — built in 3500 cycle audio filter — complete shielding — no critical external balance controls — no mixer tuning ELIMINATES OUT Of Band operation — rounded corner black crackle cabinet with gray front panel with white lettering — 9¼" H x 17¼" W x 11⅛" D — a complete wired tested and ALIGNED audio thru balanced modulator subassembly furnished with kit allows transmitter to be built as simply as a CW rig.

W and T $329.50 Kit $279.50

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P-400-GG

Grounded Grid Linear Amplifier

new new new new new new



NEW

CHECK THESE OPERATING FEATURES:

- √ Utilizes 4 — 6CN6 grounded grid hi-mu tubes. Low cost in replacement.
- √ Requires less than 20 W PEP driving power.
- √ Wide range Pi network output circuit and Bandswitching 80M thru 10M.
- √ Exclusive power switching circuit makes it impossible to apply plate voltage before filaments are turned on.
- √ Exclusive metering circuit reads GRID Ma. PLATE Ma. WATTS Input and WATTS Output directly in WATTS on the meter.
- √ Complete built in power supply gives 1250 V DC 380 MA with 30 MFD filter capacity for maximum dynamic plate supply regulation.

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CQ-9

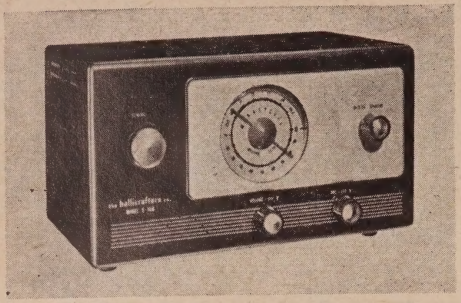
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Dear OM:

Concerning the young ladies on page 16 (Aug.). Ann is sweet sixteen and has 6 months left in which to be kissed.

Judy, W9DDS

OM:

Re. your puzzle page 16, I derived the following equations using the unknowns: X—Mary's age, Y—Ann's age.

1) $X + Y = 44$ (this was easy . . .)

2) $Y - \left[X - \left(2\ [X - (Y - \frac{X}{2})]\right)\right] = 2\left[X - (Y\frac{X}{2})\right]$

9

Reducing and solving, the answer is: Mary—27½ yrs. Ann—16½ yrs.

Phil Hurst, WØQPS

stolen from
Wash. D.C. Mobile Radio Club

AUTOCALL

We wish to warn you on this one before you start. This is the famous "ladder" problem and is very deceptive. It looks easy, but it isn't. It has been said that if you wish to keep a mathematically interested person as a friend, do not give him the ladder problem. Anyway here it is:

Two ladders are leaning against the walls of an alley. One ladder is 40 feet long, the other is 30 feet long. The two ladders cross 10 feet above the alley. The butt ends of each ladder touch opposite walls. How wide is the Alley?

OUR COVER

The PJ2MC "shack" is set up in the suite occupied by Queen Wihelmina when she was touring her Caribbean possessions. Sitting inside, just out of sight, are Reg, his wife Louise, son John, and Bill Thomas KV4BB of St. Croix. Photo by Stan Butryn KP4AAO, who dropped in with his helicopter for a visit.



He read the specs UNBELIEVABLE!

THE NEW **HAMMARLUND**

HQ-(Shhhhh—censored till September)

DX [*from page 70*]

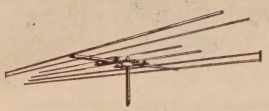
W2QHH	241	W4LQN	175	W2HAZ	117
W1HX	236	W1BFT	174	K2QQO	116
W8UAS	235	DL6MK	160	W7NFE/6	115
W4GG	232	QE1FF	158	K5ABW	102
W2HMJ	230	ON4QX	158		
W2BJ	229	W3LVJ	157	PHONE ONLY	
W2HZY	228	DL1YA	153		
4X4RE	227	W8AE	145	WAZ	
W1JYH	227	W6ETJ	144	VQ4ERR	241
W2GT	227	JA1CR	144	G8IG	194
W3DRD	227	VE6MN	143		
W8DMD	225	OK3EA	138	39 ZONES	
W4LVV	225				
W3OCU	224	37 ZONES		PY2CK	239
W5MPG	223			W6DI	218
W9ABA	223	W4HA	218	XE1AC	217
W5FFW	220	KP4CC	205	W3LTU	206
W1HA	220	W8YIN	205	W6AM	195
W3DKT	220	W6KYG	200	W6VFR	188
VK4FJ	219	WØANF	188	PK4DA	175
CO2SW	219	K2GMO	184	W7HTS	161
W3KDP	218	W1JNV	181	W8HUD	161
W9MXX	215	W3WU	178	F9BO	158
W1ZL	214	W3AYS	178		
KP4KD	214	W1WY	176	38 ZONES	
W4RRQ	213	IT1TAI	173		
OZ7BG	213	W2OST	169	W9NDA	225
WØAZT	212	VE3LJ	167	W9RBI	225
W1KFV	212	W8PUD	166	W2BXA	204
W8KPL	210	W5HDS	164	SM5KP	199
W6GPB	209	W1APA	162	W6KQY	198
W2HHF	208	W3ARK	159	W4CYU	160
W8HFE	207	K6JQJ	152	ZL1HY	157
W2CMW	207	W6YK	144	W1HKK	153
W2GVZ	207	W2OGE	143		
W6TXL	201	OH3OE	124	37 ZONES	
W8WO	201	1IER	119		
VF3AAZ	199			W3JNN	215
K2GFQ	198	36 ZONES		W8KML	201
WØQVZ	196			W3GHD	195
OF3WB	193	W5JUF	206	ZS6Q	192
W7CNM	193	W1TYQ	187	W3BES	190
W2IMU	192	W4QCW	186	W1JCX	189
GM3CSM	192	W2ZVS	182	G3DO	188
W5MET	192	W8JGU	180	OE3AB	186
W8CED	192	W2HSZ	177	W8BF	183
G3FXB	187	WØAIH	176	W8REU	176
VK1XO	183	W9KXK	168	VK3BZ	173
W6DBP	183	W4THZ	167	W6PXH	159
DL4ZC	179	K2BZT	163	WØHX	157
W2PGV	178	W6UQQ	159	W6TT	145
W8VLK	177	W1JDE	158		
ZL4BO	176	W9FNR	156	36 ZONES	
F9AH	173	W1QJR	155		
W4DKA	172	K6FNX	148	W1MCW	222
W9NZZ	169	WØCU	145	W1NWO	219
WØRBA	163	W6YMH	145	W4HA	205
G6QX	162	W1FZ	137	W3ASG	191
W6CAE	161	WØQBA	141	CT1PK	182
W9ALI	160	K6EIV	139	TI2TG	182
W6MUF	157	W6WWW	108	W9RNX	181
W6CUL	154			W4ESP	177
TF3SF	145	35 ZONES		WØNCG	174
				W3EVW	170
38 ZONES		KV4BB	185	W1BEQ	164
		W1DEP	184	GM2DBX	163
W8JBI	228	KG4AF	182	W9BVX	160
PY4IE	215	W8MWL	172	W2DYR	140
W5KUJ	210	LU5AQ	166		
W8KML	210	W1ODW	164	35 ZONES	
W9FDX	208	W9NN	161		
GM3EST	203	W1DSF	157	HC2JR	176
W7ADS	197	W1RAN	154	HB9J	172
W5FXN	196	W6ZZ	154	W5JUF	171
W4CPA	195	W5AWT	149	W6CHV	159
WØTKX	189	W2AZS	142	W6PCK	152
W9FNR	189	W3CPB	142	W8MWL	151
W2SHZ	188	EA4BH	127	W2RGV	148
W9VP	187	CR6AI	133	WØANF	145
W3AXT	183	ZL3CP	129	W7HXG	142
EA4CR	180	W6HJ	129	PY2JU	140
W9LI	179	K6ENL	126	WØCPM	139
W9WCE	175	K6CJQ	123		

BC-348 [*from page 60*]

that when the BC-348 is adjusted for a.v.c, the receiver gain control has no effect on the output level of the Q-5'er. Volume is controlled by the setting of the audio gain control on the Q-5'er and its antenna trimmer knob setting. The latter affects the sharpness of the tuning somewhat. For additional selectivity, turn on the crystal filter of the BC-348 and tune the signal into the crystal notch before tuning the Q-5'er.

For CW reception, turn on the b.f.o. on the BC-348 and adjust the receiver for "MVC". Tune in a CW signal. Tune the Q-5'er for the desired signal. A Heterofil, or a Range Filter adjusted to *accept* a 1020 cycle note inserted between the Q-5'er and headphones will

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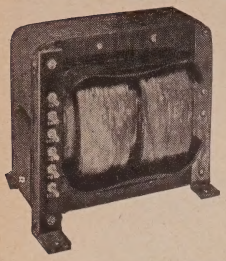
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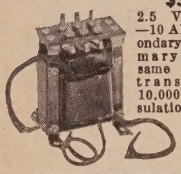


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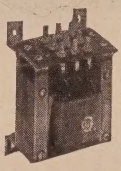
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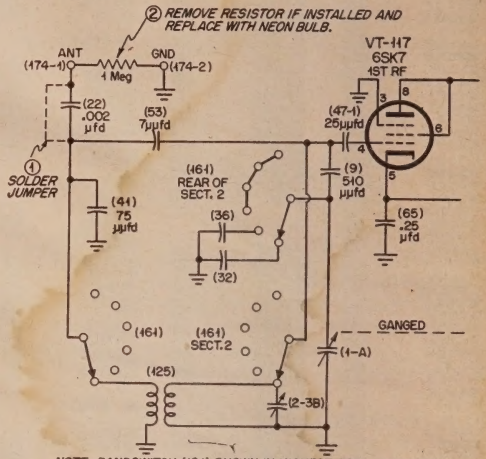
267 Washington Street, Dorchester, Mass.

Telephone: AVenue 2-8088

improve the selectivity even more.

Remarks

In all operation, strive to prevent overloading of all circuits. With the BC-348 on "MVC", always keep its gain control at the minimum required to deliver the desired signal to the Q-5'er. Keep the audio gain control of the Q-5'er at the minimum required for satisfactory speaker or headphone operation. An overloaded circuit is a broad circuit. Be sharp. Don't overload.



NOTE: BANDSWITCH (464) SHOWN IN HIGHEST FREQ. POSITION. FOR CLARITY, CIRCUITS OF OTHER POSITIONS OMITTED.

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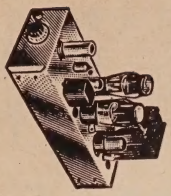
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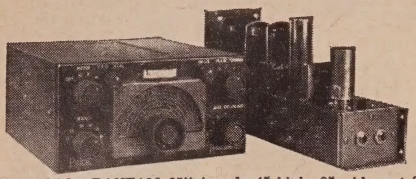
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Disadvantages of this system because of the outboard arrangement are far outweighed by the advantages of low cost (compared with the high price of a really selective receiver) and the fact there is no permanent alteration damaging to the resale-ability of the BC-348.

Although we have referred to the BC-348-Q throughout, this method is equally applicable to other models of the BC-348 and other receivers, so long as the receiver i.f. lies within the 520 to 1500 kc tuning range of the BC-946-B. ■

Trip to Europe

[*from page 47*]

doublet (broadside to the U. S.) and an SX-24 receiver; a beam, an 813 and a more modern receiver are planned.

Unfortunately, the stay in Beirut was too short to permit a visit to some of the other OD5's.

In Milano, Italy, I was met at the airport by WØVIA, presently working in Italy, and that evening he and I were royally entertained at a dinner in the Continental Hotel, which is operated by I1II. Present were I1II, WØVIA and their XYL's, I1AXD, Secretary of the A.R.I., and Ing. Mr. Pallavicino, an official of the F.A.C.E. electronic manufacturing plant in Milano.

I1AXD expressed considerable interest in our Novice Class of License, indicating his belief that some similar attraction would serve to encourage younger radio enthusiasts in Italy. TV has made its appearance in Italy, too, and Italian amateurs are adjusting themselves to coexistence with the one-eyed monster.

After dinner we visited the apartment of I1II on an upper floor of the hotel. "Tino" has a dual three-element *Telrex* rotary for 14 and 21 mc on the roof of the hotel and a quick check of the band with his AR-88 receiver showed that contact with the U. S. was virtually assured. Although time on the air at I1II was limited to about 45 minutes on the 14 mc band, contacts were made with W4YLL, KV4AA, W3KT (who provided my XYL with a PX on

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(See sister unit below.)

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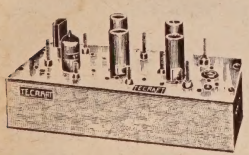
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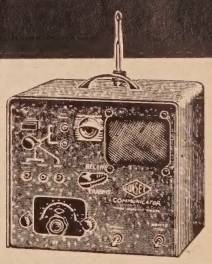
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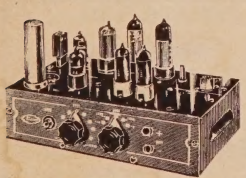
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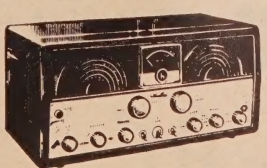
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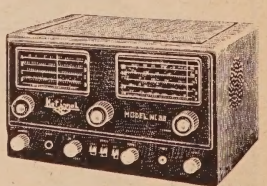
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my whereabouts), W8NBK and W1DC. All "W" signals were quite strong, demonstrating that the usually-superb "I-W" path works both ways.

The last port of call on my trip was Madrid. Most of the time there was spent in the company of old friends W3MNH and WØGTG, both of whom are working in Madrid. Again, limited time permitted only one visit to a local ham station, that of Rafael Van Baumberghen, EA4CH. Rafael's entirely home-built station was found to be neat as a pin. His XYL took pains to point out, however, that he had spent some time tidying up the shack in anticipation of our visit and assured us that it customarily enjoyed the cluttered and more typical appearance of a ham station! A 14 mc 2-element rotary, 200 watts to a VFO-driven 813 and a FB double conversion superhet of Rafael's design and construction resulted in several "W" QSO's, including one with W1DC (for our third QSO from as many European countries in three weeks!), within a matter of minutes.

Television has not yet begun in EA-land on any large scale, although a TV station is under construction and EA4CH, who built his own 12-inch TV set, was one of the first Madrid residents to receive the initial experimental telecasts made in Madrid last year. As in Italy, the "W" signals were found to be outstanding, vying for position with signals from northern European stations. EA4CH and, in fact, most Madrid hams have downtown locations. Madrid has few suburban areas as we know them and, while transmitting antennas are likely to be found atop the apartment building in which the ham resides, noise levels also are higher than desirable and line voltage regulation is often a problem.

This brief opportunity to rub shoulders with some of the European brethren clearly reaffirmed for my benefit the fact that the qualities of hospitality, helpfulness and friendliness which we call "ham spirit" are to be found wherever there are hams. Political and language differences are insignificant handicaps in the world of amateur radio. ■



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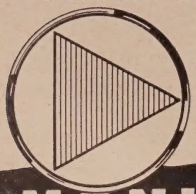
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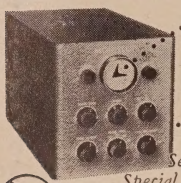
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WANTED: 75A4 or better receiver. Cash purchase. W6KG, Lloyd Colvin, 1636½ Berkeley Way, Berkeley, Calif.

WANTED: HEATH GDO and Antenna-scope. Have Lysco 10 meter mobile transmitter; B&W balun coils; 75 meter walkie-talkie. WØTWL, Republic, Missouri.

WANTED: 30-50 mc F.M. converter or receiver; also 150-160 mc F.M.—Sell or Swap Bromeco CD-10X, Morrow 3BR5, PE-103 Triplett model 1213 tube tester, Command transmitters and power supplies. All answers replied. John A. Jackman, W1UAD, 46 Devonshire Rd., Milford, Conn.

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WANTED: BC-348, BC-312, BC-342, ARC-1, ARC-3, APR-4, TN-19, TN-54, ARN-7, BC-788C, BC-610-E, BC-221, Teletype, ART-13. Cash or trade for NEW National, Johnson, Hallicrafters, Elmac, Gonset, Telrex, Fisher Hi-Fi etc. Write or phone Tom, W1AFN, Alltronics, Box 19, Boston 1, Mass.

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SWAP: I will trade commercial amateur equipment for airplane. Any airplane considered. I have xmtrs and receivers, both fixed and mobile. Write to Harlan P. Milhorn, K4BSA, RFD No. 7, Johnson City, Tennessee.

SWAP OR SELL: HT-18 VFO, $40. Link A, 10 Mtr. Mobile Xmtr with 6V Dynamotor, fixed freq., 807 final, $25. Wanted: Millen grid dipper, 3" Scope, antennascope or bridge, VTVM, Audio Signal Gen. K6EYB 760 Via Marin, San Lorenzo, California.

SWAP OR SELL: Aircraft transmitter, AVT-15 A; Aircraft receiver AVR-20-A; and a 9 foot whip, with 80 mtr. loading coil. Makes a swell 80 meter mobile rig. Swap complete rig, including mike and power cables, for 6 meter or best offer over $80. Paul Playford, W8AEF, 319 Union Street, Lawton, Michigan.

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ANNOUNCING: 19th Annual Stag Hamfest, sponsored by Greater Cincinnati Amateur Radio Association. Biggest bargain hamfest in U.S.A.; over 850 actual amateurs attended last year. When—September 9, 1956 —Where—Kopling Grove on Winton Road, two miles south of Greenhills, Ohio, near Cincinnati. For additional information, contact Elmer Schubert, W8ALW, 3965 Harmar Court, Cincinnati 11, Ohio.

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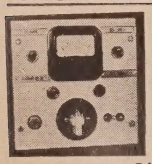
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Propagation [*from page 77*]

near maximum, and probably record breaking sunspot activity. Unless an ionospheric disturbance develops during the Contest period, DX conditions will more than likely be better than during any previous Contest period. No doubt the record breaking scores of last year will be surpassed as radio propagation conditions reach an all time peak. For this reason, next month's column will be devoted exclusively to a Contest propagation analysis and forecast. If you intend taking part in the Contest, *don't miss next month's column.*

The CQ Short-Skip Propagation Charts are based on a radiated power of 75 watts. These forecasts are calculated from basic ionospheric data published by the CRPL of the National Bureau of Standards and are valid through October 15, 1956.

73, George, W3AST

Scratchi [*from page 8*]

He already to blasting away part of mounten, having dinamite all set with blasting caps attached and all, but can't going ahed on acct. of CD eggsersize. So he leeving everything that way. When Scratchi neer blasting caps, signal from rig are setting off blasting caps, and 1/c ruckus are following. Everytime Scratchi moving, he getting neer another load of dinamite.

At this point Scratchi are to mad to be mad, espeshyoually on acct. contracktor are going to fixing up car for me in 1/c shape.

CD peeples are skedyuling new CD alert for next week so everybuddies seeming happy. Hon. Ed., for next week alert Scratchi not getting invited to attend. You thinking I should volunteering?

Respectively yours,
Hashafisti Scratchi

Bandspread [*from page 43*]

be even a little more so, but I don't expect everybody to make a wild dash for the junk box to duplicate this thing. I offer it as an idea to the guy who rolls his own and is looking for a way to calibrate his next ECO or receiver directly in kc with enough bandspread so he can read it down to a Gnat's eyebrow without using his specs.

Just one last thought—This is useless unless used with *stable* oscillator circuits. Tenancy to drift will show up immediately, and how much they drift will be apparent too. A three kc drift will look like a mile.

Test Lamp [*from page 62*]

be used without danger of harm for checking filament continuity of all types of tubes except battery-operated series. Used on speaker voice coil tests, both aural and visual indications are given.

While a.c. is not suitable for checking electrolytic capacitors, the test lamp is ideal for use with oil and paper dielectric filter capacitors. A shorted unit, of course, will be indicated by full brilliancy of any wattage lamp in the tester. Serviceable units will pass a-c current in proportion to their capacities. A rough estimation of the capacity can be made after a little experimenting with various wattage lamps and capacitors of known values.

Filter chokes are a little more difficult to assess, since both d-c resistance and reactance enter into the picture. However, if two chokes have approximately equal d-c resistance as shown on an ohmmeter, but different brilliancies on the a-c test lamp, obviously the choke giving the brightest indication has the least inductance and, hence, the lowest rating in Henrys.

The experimenter can check out practically any piece of a-c operated equipment of unknown characteristics by starting out with the 7½-watt lamp and working on up through larger sizes until the desired reaction is obtained.

Editor's note: A house fuse or screw-in circuit breaker used in place of the lamp gives you the full line voltage for testing a piece of equipment that may give trouble. All newly constructed equipment in my shack gets the first test with a lamp, then with a circuit breaker, just in case. ■

VHF [*from page 96*]

Pluckemin, New Jersey Bill Ashby (K2TKN ex WØETJ) explains his outstanding signals:

"After moving into the wild hinterlands of the New Jersey hills some three months ago, fully expecting to hear a few feeble modulated oscillators, vertical of course, I proceed to fire up the sausage grinder on 144.002—YIPES—this is 'Aurora Alley' amid the Crashing Kilowatts! So—finding my 4-125's wid 3600 volts, and somewhat over a KW of audio on the plates hold up well in this sort of friendly comeraderie—we are in business—forthwith. Antennas at present are only temporary—stacked 15 element, Telrex's at 85 feet and my 64 elements broadside at 60 feet which motor-tilts to 90 degrees as well as rotates. (Strips gears well in a wind too) Diversity—yes! W2NLY has up his 8 bays—each about 23 feet long and W2CXY and his exceptional location are near my frequency so ant. nothing to write home about. Receiver is in 3 four foot racks—can't hear anything anyone else can't—but I have more knobs to twiddle. By 15th of July, barring west coast openings, will have full jug on sideband as this beats pounding brass.

"Are you going to work only at rise and set or will you be able to track? If former, please forward any takers who can tilt and we will run automatic-track skeds. 73 and hope we QSO the long way (hard way?)." *Beam tilting is the only practical way of doing it, Bill. So far I have no info on anyone else who can track.*

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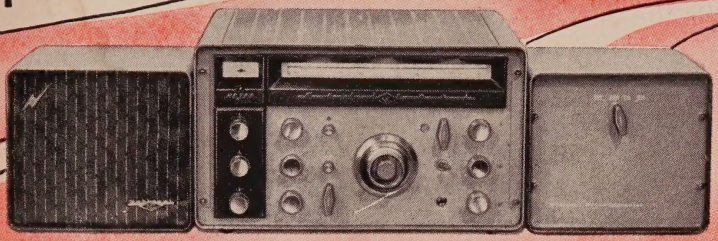
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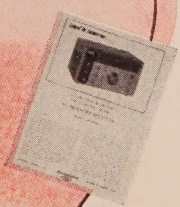
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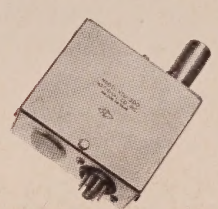
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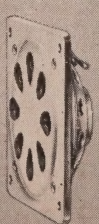
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